THE UNIVERSITY OF MINNESOTA

BULLETIN

Vol. VIII MAY 15, 1905 No. 8

The Department of Agriculture.

The College of Agriculture.
The School of Agriculture.
The Dairy School.
The Short Course for Farmers.
The Experiment Station.

The University Bulletins are issued every six weeks during the University year, at least six numbers every calendar year. Entered at the Postoffice in Minneapolis as second-class matter.

MINNEAPOLIS, MINN.

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THE REGISTRAR,
The University of Minnesota,
Minneapolis, Minn

The University

THE UNIVERSITY OF MINNESOTA comprises the following named colleges, schools and departments:

THE GRADUATE DEPARTMENT

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE SCHOOL OF MINES

THE DEPARTMENT OF AGRICULTURE, including—
- *the College of Agriculture*
- *the School of Agriculture*
- *the Dairy School*
- *the Short Course for Farmers*

THE COLLEGE OF LAW

THE DEPARTMENT OF MEDICINE, including—
- *the College of Medicine and Surgery*
- *the College of Homeopathic Medicine and Surgery*
- *the College of Dentistry*
- *the College of Pharmacy*

The Regents of the University have also entrusted to their charge

THE EXPERIMENT STATION, including—
- *the Main Station at St. Anthony Park*
- *the Sub-Station at Crookston*
- *the Sub-Station at Grand Rapids*

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

THE GRADUATE DEPARTMENT. In each of the colleges, except those of medicine and dentistry, there are advanced courses of study leading to second degrees. These courses are open to graduates of any reputable college upon presentation of diploma.

In the COLLEGE OF SCIENCE, LITERATURE AND THE ARTS, there is a four-years' course of study leading to the degree bachelor of arts. The work of the first year is elective within certain limitations as to the range of subjects from which the electives may be chosen. The remaining work of the course is entirely elective, with the provision that a certain number of long courses be selected. The course is so elastic that it permits the student to make the general scope of the course classical, scientific or literary, to suit the individual purpose.

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY, leading to the degrees analytical chemist or chemical technologist, offers two courses of study of four years each in analytical and applied chemistry.

A Summer School for Teachers. A six-weeks' course of instruction is offered, in various University subjects, for those whose school duties prevent them from taking the regular University courses.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS offers courses of study, of four years each, in civil, mechanical, electrical and municipal engineering leading to the degrees of civil, mechanical, electrical and municipal engineer. This college offers a four-years' course of study in science and technology leading to the degree of bachelor of science, with an additional year leading to the engineer's degree in any one of the various lines offered in the college. This college also offers graduate work leading to the degree master of science.

THE SCHOOL OF MINES offers a four-years' course of study in mining and metallurgy upon completion of which the degrees engineer of mines and metallurgical engineer are conferred.

THE COLLEGE OF AGRICULTURE offers a four-years' course in agriculture. The degree of bachelor of science in agriculture is conferred on completion of the course. Students in this college may specialize along the line of forestry or home economics and secure the degree bachelor of science (in forestry or in home economics).

THE SCHOOL OF AGRICULTURE offers a three-years' course of study and is a training school for practical farm life and in domestic economy. The college of agriculture is open to graduates of this school who have completed the fourth year of work required for admission to the college.

The Dairy School offers practical instruction in dairying to those who are actually engaged in the manufacture of butter and cheese.

The Short Course for Farmers is designed to be of the greatest help possible to those actually engaged in farming.

THE COLLEGE OF LAW offers a three-years' course of instruction leading to the degree of bachelor of laws. Graduate work leading to the degrees master of laws and doctor of civil law is offered. There is an evening class provided in this college.

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY offer four-year courses of study of nine months each. Upon completion of either of the prescribed courses the degree doctor of medicine is conferred.

In the colleges of science, literature and the arts, of medicine and surgery, and homeopathic medicine and surgery, there has been established a combined course of six years leading to the degrees of bachelor of science and doctor of medicine.

THE COLLEGE OF DENTISTRY offers a three-years' course of study of nine months each. Upon completion of the prescribed course the degree of doctor of dental surgery is conferred.

THE COLLEGE OF PHARMACY offers a two- or three-years' course of study leading to the degree of pharmaceutical chemist. This college also offers graduate work leading to the degrees master of pharmacy and doctor of pharmacy.

SPECIAL COURSES. In each of the colleges, students of an advanced age and adequate preparation are permitted to pursue, under the direction of the faculty, one or two distinct lines of study.

The University offers no correspondence courses.

The Board of Regents

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FREDERICK J. WULLING, PHM. D., LL. M., *Dean of the College of Pharmacy*

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ALLEN W. GUILD, *Superintendent of Buildings*
EDWIN A. CUZNER, *Superintendent of Grounds*

Calendar for 1905-1906

1905 1906

JULY

S.	M.	T.	W.	T.	F.	S.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

AUGUST

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

SEPTEMBER

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	**11**	**12**	**13**	**14**	**15**	**16**
17	**18**	19	20	21	22	23
24	25	26	27	28	29	30
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OCTOBER

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
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NOVEMBER

..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	**30**	..	..
..	..	..	..	..	..	..

DECEMBER

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	**25**	26	27	28	29	30
31	..	..	..	..	..	..

JANUARY

S.	M.	T.	W.	T.	F.	S.
.	1	2	3	4	5	6
7	**8**	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	...	..

FEBRUARY

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	**12**	13	14	15	16	17
18	19	20	21	**22**	23	24
25	26	27	28	..	..	..
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MARCH

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
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APRIL

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..
..	..	..	..	..	..	..

MAY

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

JUNE

..	..	..	..	..	1	2
3	**4**	**5**	**6**	**7**	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

University Calendar, 1905-1906

The University year will hereafter open on the Tuesday before the second Thursday in September, and close on the second Thursday in June.

FIRST SEMESTER.

SEPTEMBER	11	M	Examination in English, required of all new students.
	12	T	Entrance examinations and registration.
	13	W	Entrance examinations and registration.
	14	T	Entrance examinations and registration.
	15	F	Entrance examinations and registration. (First College classes organized, 1869).
	16	S	Examinations end and registration completed.... 1 w
	18	M	Classes called for regular work.
	23	S	..... 2 w
	30	S	..... 3 w
OCTOBER	7	S	..... 4 w
	14	S	..... 5 w
	21	S	..... 6 w
	28	S	..... 7 w
NOVEMBER	4	S	..... 8 w
	11	S	..... 9 w
	18	S	.....10 w
	25	S	.....11 w
	30	T	Thanksgiving Day. Holiday.
DECEMBER	2	S	.....12 w
	9	S	.....13 w
	16	S	.....14 w
	23	S	Holiday recess begins (no classes) .....15 w
	25	M	Christmas day.
JANUARY....	1	M	New Year's Day.
	8	T	Work resumed in all departments.
	13	S	.....16 w
	20	S	.....17 w
	27	S	Semester Examination VII and VIII hour work..18 w
	29	M	" " I hour work
	30	T	" " II " "
	31	W	" " III " "
FEBRUARY	1	F	" " IV " "
	2	F	" " V " "
	3	S	" " VI " " .....19 w

SECOND SEMESTER.

FEBRUARY	5	M	Second Semester begins—Classes called for regular work.
	10	S	..... 1 w
	12	M	Lincoln's Birthday, Holiday.
	17	S	..... 2 w
	18	S	University Charter, 1868. General Sibley died 1891.....
	22	T	Washington's Birthday.
	24	S	..... 3 w
MARCH	3	S	..... 4 w
	10	S	..... 5 w
	17	S	..... 6 w
	24	S	..... 7 w
	31	S	..... 8 w
APRIL	7	S	..... 9 w
	14	S	.....10 w
	21	S	.....11 w
	28	S	.....12 w
MAY	5	S	.....13 w
	12	S	.....14 w
	19	S	.....15 w
	26	S	.....16 w
JUNE	2	S	Semester examinations. VII and VIII hour work..17 w
	4	M	" " I hour work.
	5	T	" " II " "
	6	W	" " III " "
	7	T	" " IV " "
	8	F	" " V " "
	9	S	" " VI " " .....18 w

COMMENCEMENT WEEK 1906.

SUNDAY	June 10	Baccalaureate Service.
MONDAY	June 11	Senior Class Exercises.
TUESDAY	June 12	Senior Promenade.
WEDNESDAY	June 13	Alumni Day.
THURSDAY	June 14	Commencement Day—The Thirty-fourth Annual Commencement.
FRIDAY	June 15	Summer Vacation Begins.

PROGRAM OF EXAMINATIONS, SEPTEMBER, 1905.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.
THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.
THE SCHOOL OF MINES.
THE COLLEGE OF LAW.
THE SCHOOL OF CHEMISTRY.

The numbers placed after the subjects, when given, indicate the rooms in which the examinations will be held.

Day	Hour	Subjects for admission to the freshman class.
Monday, September 10,	9:00 a. m.	English—required of all.
Tuesday, September 11,	8:00–10:30	*Elementary Algebra.
	10:45– 1:15	*Higher Algebra.
	2:30– 5:00	*Plane Geometry.
Wednesday, September 12,	8:00–10:30	*Solid Geometry.
	10:45– 1:15	†All History Subjects.....17
	2:30– 5:00	†Civics.....16
Thursday, September 13,	8:00– 10:30	†Political Economy.....16
		*German.
		*French.
	10:45– 1:15	*Latin Grammar.
	2:30– 5:00	*Greek.
		*Cæsar.
Friday, September 14,	8:00–10:30	*Cicero.
		*Vergil.
	10:45– 1:15	§Chemistry.....
		**Physics.....
	2:30– 5:00	‡Botany.....29
		‡Zoology.....35
		*Astronomy..... B
Saturday, September 15,	8:00– 10:00	‡Geology.....18
	10:45– 1:15	¶Physiography.....18
		¶Drawing.....24
		¶Shop Work.....

*Place to be announced; †Library Building; ‡Pillsbury Hall; §Chemical Laboratory; **Armory; ¶The Shops.

The College of Agriculture

THE FACULTY

CYRUS NORTHROP. LL. D., *President.*
WILLIAM LIGGETT, *Dean.*
SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*
HARRY SNYDER, B. S., *Professor of Agricultural Chemistry.*
T. L. HAECKER, *Professor of Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*
ANDREW BOSS, *Associate Professor of Agriculture, in charge of Live Stock.*
FREDERICK L. WASHBURN, M. A., *Professor of Entomology.*
D. D. MAYNE, *Principal of School of Agriculture, Economics.*
CATHERINE COMFORT, B. A., *Preceptress.*

INSTRUCTORS.

WILLIAM ROBERTSON, B. S., *Agricultural Physics.*
J. A. VYE, *Penmanship, Accounts.*
J. M. DREW, *Blacksmithing, Poultry.*
JUNIATA SHEPPERD, M. A., *Cooking, Laundering.*
MARGARET BLAIR, *Sewing.*
JOHN A. HUMMEL, B. Agr., *Agricultural Chemistry.*
C. P. BULL. B. Agr., *Agriculture.*
WILLIAM BOSS, *Farm Structures.*

ASSISTANT INSTRUCTORS.

A. J. RUGGLES, B. S. A., *Entomology.*
W. T. COX, *Forest Valuation and Lumbering.*
H. CUZNER, *Silviculture.*
D. A. GAUMNITZ, B. Agr., *Animal Husbandry.*
A. D. WILSON, *Agriculture.*
C. C. LIPP, D. V. M., *Physiology and Veterinary Medicine.*

In the College of Agriculture three regular courses of study are offered: A course in agriculture, a course in forestry, and a course in home economics.

REQUIREMENTS FOR ADMISSION TO ALL COURSES IN THE COLLEGE OF AGRICULTURE.

Graduates of the school of agriculture, who have completed the studies prescribed in the intermediate course, or fourth year, and graduates of approved high and normal schools, as approved by the committee on entrance requirements and course of study, are admitted to the freshman class in the courses in the college of agriculture; the former to Division "A," and the latter to Division "B."

Students who take courses in the college of science, literature and the arts, or in other colleges of the University, are required to conform to rules published in the bulletins of the respective colleges.

Students from other colleges and universities: Graduates from other colleges and universities may be admitted upon presentation of certificates, and will receive credit from the several professors for all work satisfactorily completed of similar character and grade to that given in this course.

Special students: Graduates of the school of agriculture may be admitted as special students and be allowed to pursue such studies in the course offered in the college of agriculture as are approved by the faculty.

All students in the college of agriculture must advise with the dean or the committee on college and graduate work concerning all electives. No student is allowed to enter any course until such course is properly entered upon the student's registration card by the registrar of the University, and no credit shall be given for subjects in which the student has not been previously registered.

GRADUATE WORK.

Special facilities are offered to graduate students from this and other agricultural colleges who wish to become familiar with methods employed in experiment station work, and to pursue their collegiate studies further. Courses for major and minor subjects may be arranged by consulting the professors in the different divisions. Students who enter for advanced degrees register with the committee on registration of the college of agriculture and must take their major subjects in the college of agriculture, but they may take one or both of their two minor subjects in the college of science,

literature and the arts. Graduate students registered with the committee on graduate studies in the college of science, literature and the arts may take one or both of their minor subjects in the college of agriculture.

I. The degree of Master of Agriculture will be conferred on a bachelor of this or any other agricultural college of equal grade who, not sooner than one year after graduation, if a resident graduate student at this agricultural college, shall pass an examination in certain prescribed lines of study and present a satisfactory thesis.

II. All general regulations of the college of science, literature and the arts, governing candidates for the master's degree, method of selecting work, amount of work required, degree of proficiency expected, and the time and manner of conducting the examinations, apply to candidates for master's degrees in the college of agriculture.

III. The degree of Doctor of Philosophy will be conferred by the college of agriculture on bachelors of this or any other agricultural college of equal grade within not less than three years after graduation therefrom under conditions similar to those prescribed by the faculty of the college of science, literature and the arts.

FEES.

All students in the college, who are residents of the state, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

REQUIREMENTS FOR GRADUATION AND DEGREES.

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work, together with such practical experience as may be required by the committee on college course, students in the courses in agriculture will be recommended for graduation with the degree of bachelor of science in agriculture; students in forestry with the degree of bachelor of science in

forestry, and students in the course in home economics with the degree of bachelor of science in home economics.

The elective studies designed as academic are to be chosen from the printed semester programs of work offered in the colleges of science, literature and the arts, law, medicine and engineering; no student to take more than two semesters in either of the three last named colleges. The elective studies designated as agricultural are to be chosen from the printed program of work offered in the college of agriculture.

THE COURSE IN AGRICULTURE.

The course in agriculture is designed to give the student a broad education in the sciences and arts relating to agriculture and to fit him for the work of the agricultural specialist. The physical and biological sciences are made prominent. The work in these subjects is begun in the first or second year and may be continued throughout the course. For the first two years, the lines of study are prescribed, the subjects being chosen with a view of giving a good foundation for the work which follows. For the last two years, the work is mostly elective and gives the student an opportunity to take work along certain lines for which he has a special aptitude and liking.

In the college of agriculture a portion of the work is taken in the college of science, literature and the arts. All academic electives and the prescribed work in higher algebra, drawing, geology, German, French, rhetoric, trigonometry, botany, zoology, psychology, English literature, logic, philosophy, pedagogy and history are taken in the college of science, literature and the arts. The agricultural electives and the prescribed subjects not mentioned above are taken at University Farm.

GENERAL COURSE IN AGRICULTURE.

FRESHMAN YEAR.

DIVISION "A."

FIRST SEMESTER.	SECOND SEMESTER.
Mathematics [3]	Mathematics [3]
German [3]	German [3]
Botany or Zoology (long) [3]	Botany or Zoology (long) [3]
Geology [3]	Chemistry [3]
Horticulture and dairy practicums and debate [3]	Horticulture and dairy practicums and debate [3]
Military drill [2]	Military drill [2]
Rhetoric [3]	Rhetoric [3]
	Drawing [3]

FRESHMAN YEAR.

DIVISION "B."

For graduates of approved high schools or others of equal standing. Students in this division take part of their work in classes of the school of agriculture. For descriptions of these courses see statement under school of agriculture.

Farm development [4]
Forestry (September) [4]
Dairy Chemistry (September) [4]
Blacksmithing (September) [4]
Agricultural practicums [2]
Farm zoology [4]
Handling grain and farm machinery [4]
Fruit growing [4]
Carpentry [4]
Library classification [4]
Field-crops [4]

AGRICULTURAL SCHOOL YEAR.

FIRST TERM.

Dairy husbandry [2½]
Breeding [2]
Agricultural chemistry [5]
Fruit growing [2]
Veterinary [2]
Entomology [5]
Physics [5]
Forestry [3]
Military Drill [2]
Gymnasium [2]

SECOND TERM.

Dairy husbandry [2½]
Feeding [2]
Soils and fertilizers [5]
Vegetable gardening [3]
Veterinary [2]
Study of breeds [5]
Plant propagation [3]
Military Drill [2]
Gymnasium [2]
Economics [3]

LAST HALF OF SECOND TERM.

Chemistry [2]
Poultry [3]
Blacksmithing [4]
Book-keeping [3]
Entomology [5]
Dairy stock and judging [2]
Farm development [4]
Stock judging [2]
Live-stock practicums [2]
Field crops [4]

SOPHOMORE YEAR.

Botany or zoology, long, (A) [3]
Botany or zoology, short, (A) [3]
Botany, short, (B) [3]
Zoology, short, (B) [3]
Scientific German or French [3]
Chemistry [3]
Agricultural physics [3]
Agricultural and animal husbandry practicums and discussions [3]
Rhetoric [1]
Military drill [3]

JUNIOR YEAR.

FIRST SEMESTER.

Industrial botany [3]
Soils and fertilizers [3]
Thremmatology [3]
Agricultural, elective, (A) [3]
Taxonomy (B) [3]
Academic elective [3]
Elective [3]

SECOND SEMESTER.

Plant pathology [3]
Animal feeding [3]
Farm management [3]
Agricultural, elective [3]
Academic elective [3]
Elective [3]

SENIOR YEAR.

Comparative physiology [3]
Field crops [3]
Farm structures [3]
Elective [3]
Elective [3]
Elective [3]
Veterinary, elective [3]
Stock judging [3]
Horticultural elective [3]
Elective [3]
Elective [3]
Elective [3]

JUNIOR AND SENIOR ELECTIVES.

AGRICULTURAL ELECTIVES:

Animal taxonomy [3]
Research (dairy, animal husbandry, horticulture and agriculture) [2]
Greenhouse management [2]
Taxonomic botany [3]
Plant ecology [3]
Agricultural engineering [3]
Chemical laboratory practice, courses III, VII, VIII, [3]
Animal breeding [2]
Fruit growing [3]
Dairy management [2]
Plant breeding (horticultural) [2]
Plant breeding (agricultural) [2]
Agricultural chemistry, lecture courses IV, V, [3]
Diseases of animals [2]
Bibliography of agricultural literature [3]
Animal parasites [2]
Geology [3]
Bacteriology [3]
Soiling crops [2]
Economic entomology [3]
Land surveying [2]
Seeds and seed judging [3]

ACADEMIC ELECTIVES:

Economics [3]
Literature [3]
Language [3]
Elocution [3]
History [3]
Sophomore debate [3]

AGRICULTURE.

Equipment: The general equipment of University farm is available for class and special instruction and for practice work. A seed breeding laboratory furnishes facilities for special instruction in field seeds and in laboratory work in plant breeding. The plant breeding nurseries, the variety testing and the seed distribution, afford facilities for instruction and practice to students especially interested in these lines of work. The experiments and records in field management, in crop rotation and in cultivation experiments provide material and opportunities for study and for gaining experience. Instruments of precision make practical the instruction in planning farms, land drainage, road making, and fence building. The farms of the vicinity serve as a basis for designing farm plans and farm business, and rural engineering problems can be worked out in nearby rural communities. Many useful samples, drawings, photographs, and references are being collected. The exhibits of machinery at the state fair grounds adjoining University farm, and those on exhibition in the warehouses of Minneapolis and St. Paul, supplement the collection in use at University farm. Students can study the merchandising of grain, the inspection and the grading of the various grain products in the twin cities. Statistics relating to the cost and profit of each staple farm crop are being gathered by special agents in three representative counties of the state.

A portion of the instruction in agriculture is in the form of lectures. The writing of papers on special subjects is made a

prominent feature. Research work is arranged for in many cases, and practice work on the farm and in the laboratory is provided. The aim is to have students get experience in field agriculture, both practical and experimental, and in demonstration instruction.

Course I. Seeds. [One semester.]

In this course the students are made acquainted with the physical botany, the uses, identification, vitality, testing, grading and judging of all classes of field seeds. Special attention is given to the reproducing value of seeds of various grades of grains and to the importance of testing. A thesis upon some phase of the subject of seeds is required for full credit.

Course II. Field crops. [One semester.]

In this course are considered the botany, cultivation, and economic value of the various cereal, forage, root, fiber, sugar and miscellaneous crops. Special attention is given to the subjects of meadows, pastures, soilage crops, and to the production and preservation of all kinds of dry cured and ensilaged crops.

Course III. Thremmatology. [One semester.]

Heredity, variation, laws of breeding, the art of breeding, improvement by nature and under scientific experimentation, securing foundation stocks, value of using very large numbers, immense value of the occasional individual which can transmit qualities of peculiar value, use of an ideal, use and misuse of the score card, both numerical and graphic, intrinsic qualities, fancy points and distinguishing marks, statistical methods in breeding, pedigree records of efficiency, fundamental principles underlying the arrangement of the record books, bibliography and terminology, study of the literature of breeding.

Course IV. Plant breeding. [One semester.]

Botany of the reproductive organs of field crops, field crop nursery management, producing new qualities by hybridizing and by change of environment, hybridizing versus cross-breeding, inbreeding and self fertilization, originating varieties and improving standard varieties, by selection and by hybridizing followed by selection, methods of disseminating new varieties, seed and plant introduction, experimentation in the theories relating to heredity, variation and practical breeding, seed growing as a farm business, seed merchandising. The breeding of each of the various field crops grown in Minnesota.

Course V. Agricultural engineering. [One semester.]

Subduing prairie and timber soils, land drainage, farm land mensuration and surveying; irrigation and irrigation works; roads, their location, maintenance, laws and construction, financial support; farm fences, buildings, implements and machinery.

Course VI. Agricultural economics. [One semester.]

Labor, farm finances, markets, rentals, agricultural statistics, production, exports, wages, land laws, ownership, taxes, organizations.

Course VII. Farm management. [One semester.]

In this course are considered the planning of farms, crop rotation, tillage, and systems of farming. Special attention is given to revising and drafting farm plans and to arranging economic crop rotations, and application of business methods to farm operations.

Agricultural practicums. Opportunities to gain practical experience, to acquire greater manual dexterity in doing farm work, to secure practice in conducting experiments and to get experience in teaching agricultural subjects, are offered to college and graduate students, when practicable. Students should arrange early in their course for this work, as the opportunities in plant breeding, in rural engineering, in field crops, in agricultural statistics and in assisting instructors in the various courses are available only at irregular intervals and must be arranged for in advance.

AGRICULTURAL CHEMISTRY.

Equipment. A special laboratory with modern apparatus for the analyses of soils, foods and agricultural products is provided. The equipment contains an experimental mill for the production of wheat flour, a Berthelot-Atwater calorimeter for the determination of the caloric value of foods, vacuum ovens, apparatus for the chemical and physical analysis of soils, an electrical apparatus for determining the resistance of soils to soluble salts, and the necessary facilities for human and animal food investigations. Special facilities are offered in soil investigations and in the analysis and testing of wheat, flour and cereal products for commercial purposes. Standard reference books and journals, including Jahresbericht der Agrikultur Chemie, Coptes Rendus, Biedermann's Centralblatt, Annals de la Science Agronomique and Versuchs-Stationen, are provided for the advanced work in agricultural chemistry.

Fees. In all of the laboratory courses in agricultural chemistry, a fee is charged to cover the cost of material used, and breakage. The student is assigned a certain amount of apparatus and material for which he gives a receipt, and deposits $3 with the accountant before beginning work. All apparatus returned in good condition at the close of the term is credited to the student's account upon settlement.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. All other courses are elective.

Course I. (a) General agricultural chemistry. [One-half semester.] Freshman II.

Recitations, lectures and laboratory practice. Particular attention is given to the study of the elements and compounds which are of the most importance in agriculture. The laws governing the combination of the elements by weight and volume are illustrated by numerous problems. The writing of equations, chemical nomenclature, and the periodic system of classifying the elements are prominent features of the work. In the laboratory, experiments are performed illustrating the general laws of chemistry which have a bearing upon animal and plant life.

(b) A continuation of I (a). Sophomore I. semester.

Course II. Agricultural qualitative analysis. Sophomore II.

This course is arranged to meet the wants of agricultural students. Six hours per week are given to the laboratory work and one period to a lecture and recitation. The writing of equations and the study of principles involved in the separation of the various groups and individual compounds of elements are characteristic features of this work. It is the object of this course to familiarize the student with the processes employed in qualitative analysis so that he may be able to determine the composition of all ordinary substances, particularly of those that are of the most importance in agriculture.

Course III. Agricultural quantitative analysis. Junion and senior I.

An elementary course in quantitative analysis. The principles involved in gravimetric and volumetric analysis are studied. Three

periods per week are given to laboratory work and one period to a recitation and lecture. The work includes the gravimetric and volumetric determinations of iron, acidimetry and alkalimetry, the gravimetric determination of phosphorous pentoxide, the volumetric determination of calcium oxide and determination of nitrogen and potassium oxide. The object of this course is to prepare the student for special work in agricultural chemistry, and is required of all students who elect either courses VI or VII.

Course IV. Human and animal foods. [One-half semester.]

Lectures. This course treats of the composition, digestibility and nutritive value of human and animal foods. The chemistry of plant growth, particularly the factors which influence their composition and nutritive value form an essential part of this course. The processes employed in the preparation of foods as the milling of wheat and other cereals, the economic uses of human and animal foods, the comparative value of foods, and the methods employed in nutrition investigations, particularly in proteid and carbohydrate metabolism and the losses of energy from the body are studied. Dietary studies, the cost of foods, and influence of different methods of preparation upon their nutritive value are also included in the work. It is the object of this course to familiarize the student with the fundamental principles of nutrition and the use of the literature upon the subject. Special attention is given to the economic production of foods and their utilization for human and animal food purposes.

(This course is given only in alternate years. Given during the last half of the second semester 1907.)

Course V. Soils and fertilizers. [One-half semester.]

Lectures. This course treats of the relation of soils and their fertility to the production of crops, and includes a study of the sources of plant food and the influence of tillage and manures upon the chemical and allied physical and biological changes which take place in the soil in rendering plant food available. Rock disintegration and soil production, the various types of soil formed from different kinds of rocks and their agricultural value, and the inherent fertility of soils form an essential part of the work. The control of the water in the soil, soil solutions, and leachings, the presence of injurious acid compounds, and alkaline salts, the various methods employed for the improvement of soils, soil organisms and their influence upon fertility, the organic compounds of the soil and the part which they take in soil fertility, the increase and decrease of the organic matter and the nitrogen of the soil as influenced by different methods of farming, the analyses of soils, and the application and interpretation of the results, uses of commercial fertilizers, and green and farm manures, and the causes of soil exhaustion and means employed for conservation of fertility are some of the topics discussed. Soil judging, rating, and scaling form a part of the work.

(This course is given in alternate years; given in the last half of the second semester 1906.)

Course VI. (a) *The analysis of foods.* [One semester.]

This work includes the determination of water, ash, starch, sugar, cellulose, pentosans, fats, proteids, and the different forms of nitrogen in food stuffs, the use of the calorimeter, and the polariscope in food analysis. Before completing the work, each student makes a complete proximate analysis of some food material. This course is planned to meet the wants of those who desire to become familiar with the methods employed in the analysis of foods and in nutrition investigations.

(b) *The analysis of dairy and animal products.* [One-half semester.]

This course includes the analysis of fodders, milk, butter, cheese, and animal feces. A special feature of the course are the determinations of volatile fatty acids, iodin absorption number, specific gravity, and the saponification equivalent of fats. The object of this course is to meet the wants of those who desire to become familiar with the methods of investigations employed in research in dairy chemistry.

(c) *The technical analysis of wheat, flour and cereals.* [One semester.]

A study of the roller process of flour production, the grading and testing of wheat for technical purposes, the testing of flour by

chemical methods and the bread making value of flour as determined by comparative baking tests. Ample facilities are offered for this work as the laboratory is equipped with a complete miniature flour mill capable of producing the various grades of flour.

Course VII. The analysis of soils and fertilizers.

(a) *The chemical analysis of soils.* [One semester.]

Laboratory practice in the chemical analysis of soils and the study of the chemical methods employed in soil investigations. Particular attention is given to the study of the organic compounds of soil, and an opportunity is offered for the study of experimental soil work applied to field investigations.

(b) *The physical analysis of soils.* [One-half semester.]

Laboratory practice in the physical analysis of soils by means of Hilgard's eleutrator, and the sedimentation methods as modified by the use of centrifugal apparatus.

Courses VII (a) and VII (b) are intended for students who desire to make a specialty of the subject of soils.

Course VIII. Special problems. [One semester.]

Seminar and laboratory work in the study of special problems in Agricultural Chemistry, as the analysis of water for irrigation purposes, the adulteration of foods, dietetics, and problems in agricultural technology.

Course IX. Chemistry of forest by-products.

In this course a special study is made of the products of the forest other than for timber and fuel. The products studied include cellulose for the manufacture of paper, sugar, tanning materials, turpentine, tar, tar oils, resin, waxes, gums, creosote, wood alcohol, acetic acid, acetone, essential oils, charcoal, camphor, and medicinal products. The subjects of paint and methods for the preservation of wood are also taken up.

At the beginning of the course, a short time is devoted to a review of organic chemistry, special attention being given to those compounds found in wood or closely related to it. A thesis on some subject relating to the chemistry of forest by-products is required in this course.

ANIMAL HUSBANDRY.

Students who wish to specialize in Animal Husbandry are recommended to arrange their course in the junior and senior years as follows, and in addition elect the long course in zoology and the short course in botany.

JUNIOR YEAR.

Botany, short, [3]	Botany, short, [3]
Advanced meats and judging [3]	Cattle feeding [3]
Thremmatology [3]	Animal breeding [3]
Elective (animal husbandry) [3]	Elective (animal husbandry) [3]
Elective [3]	Elective [3]
Elective [3]	Elective [3]

SENIOR YEAR.

Animal feeding [3]	Veterinary elective [3]
Farm structures [3]	Research animal husbandry [3]
Research animal husbandry [3]	Nutrition studies [3]
Comparative physiology [3]	Academic elective [3]
Academic elective [3]	Elective [3]
Elective [3]	Elective [3]

JUNIOR AND SENIOR ELECTIVES.

Anatomy [3]
Dissection [3]
Stock judging [3]
Agricultural economics [3]
Chemistry of foods [3]
Stock farm management [2]
Crop rotation [1]
Soiling crops [2]
Meat studies and judging [3]
Animal taxonomy [3]
Dairy management [2]
Animal diseases and treatment [2]
Animal mechanics [3]
Stock records and compilations [3]
Bibliography of Agricultural literature [3]
Animal parasites [2]
Seeds and seed judging [2]
Animal by-products [2]
Home dairying [2]
Academic

ANIMAL HUSBANDRY DIVISION.

Equipment. Representatives of some of the leading breeds of cattle, sheep and swine are kept at University farm. Each year a number of experiments are under way in the feeding of these classes of animals, and breeding experiments are also undertaken with sheep and swine, and theoretical experiments with the smaller animals. Experiments in summer feeding cattle, sheep and swine wholly or in part on pasture are carried on each year. The new live stock building just completed affords excellent accommodations for class work in stock judging. Herds of blooded stock near the institution, and the annual show of live stock at the state fair serve for extended observation of breeds and methods of management.

Course I. Stock breeding. [One-half semester.]

Discussion of the principles of stock breeding as affecting breed maintenance and breed formation; standards of excellence and comparison of standards of breeds; heredity and the influences affecting it; prepotency, fecundity and their relation to successful breeding; the influence of nutrition on animal growth and form and the effect of artificial conditions, early maturity, selection and pedigree.

Course II. Feeding animals. [One-half semester.]

The principles of nutrition and digestion as applied to economical production; feeding rations and nutritive ratios, feed stuffs and methods of feeding, feeding of breeding stock and show stock, management of animals during pasture, yard and stall feeding for the block feeding for specific production of wool or flesh, selection of animals for the feed lot, stabling suitable for the various classes of live stock.

Course III. Stock judging. [One-half semester.]

This course is calculated to meet the needs of students desiring to become expert stock judges and of those who wish to study animal form with a view of becoming breeders of superior animals. Score card work in combination with the presence of living specimens is a feature of this course. Students are drilled in judging from the standpoints of breed, type, form, stamina, quality, breeding capacity, suitability for feeding and for general and specific production. Special opportunities are given for judging live animals fitted for the block and in judging the dressed carcasses after slaughter, thus determining by observation the quality of animals judged.

Live stock practicums: Feeding and stable management of cattle, horses, sheep and swine, recording and calculating amounts of pasturage obtained from different forage crops, keeping herd

records, writing pedigrees and recording animals, calculating feeding records and cost of production, mechanical analysis of carcasses of animals to determine total amount of meat, and proproportionate amounts of fat and lean, determinations of fat and lean meat with especially designed apparatus; calculating percentages of different parts of the carcasses.

Course IV. Stock farm management. [One-half semester.]

In this course special attention is given to the crops and rotations that fit in with live stock farming, economy of feeds and pasture production, and solution of confronting problems is made the leading feature.

Course V. Nutrition studies. [One-half semester.]

Original work in solving some special live stock problems followed by a thesis; sufficient work must have been done to make it reliable.

Course VI and VII. Animal husbandry research. [One semester.]

These two courses will consist of reviewing literature upon different phases of animal husbandry production. The experiment station records and other sources of information will largely be used. This together with original work will form the basis of extended compilation of valuable material on live stock husbandry.

Course VIII. Advanced meats and judging. [One semester.]

This course is designed especially for studying meat making animals and their products. Under general guidance each student makes up rings of animals which he studies in detail, at every step from the live state until the different parts are cooked and tested at the table. Full records and conclusions as well as illustrations are required in thesis form.

Course IX. Meat studies and judging. [One semester.]

Work along this line is a continuation of that begun in course VIII. More attention is given the more important details concerning meats and a minute study of its physical and chemical composition is required.

Course X. Stock records and compilation. [One-half semester.]

This will consist of a thorough study of systems of keeping and compiling stock records upon stock farms and at Experiment Stations. Sufficient actual practice will be required to become familiar with live stock records.

Course XI. Animal by-products. [One-half semester.]

Individual study of the by-products manufactured at the large packing houses will be required of each student. The value and place that each has in economic use is considered.

Course XII. Animal mechanics. [One-half semester.]

A study of the mechanical effects of different relationships of bone and muscle in the animal body. This applies particularly to horses. The entire feet and legs as well as the body will be studied and made clear by apparatus and original illustrations.

DAIRY HUSBANDRY.

Equipment. Students in the college course have the advantages of the equipment of the dairy school. The feeding and breeding experiments in the dairy division of the experiment station serve a most useful purpose in the collegiate instruction. The cordial relations existing between the department of agriculture and the other state institutions are often advantageous to college students well advanced in dairy work.

Representatives of several breeds of cattle are kept for

class use. Herds in the vicinity and those shown at the state fair are useful to students in this course.

Course I. Dairy stock and dairy farm management. [One semester.]

Lectures, first semester, three hours per week. Practice work one hour per week. This course is given during the first semester of the junior year. The lectures cover the breeding, rearing and management of dairy stock, the points and characteristics essential in animals intended for the dairy practice work in judging dairy stock, and the management of the dairy herd.

Course II. Feeds and feeding. [One semester.]

This course consists of lectures covering scientific and practical questions underlying the principles of feeding. Practice work is given in formulating rations, in estimating the comparative value of food stuffs and in other problems connected with the subject. (Given in years beginning with even numbers.)

Course III.—Course in factory dairying. [One-half semester.]

This is offered during the session of the dairy school, beginning November 20. Lectures in the forenoon on dairy bacteriology, dairy chemistry, the care of milk and cream, lactic cultures, flavors, creamery milk, cream ripening and churning, working and packing butter. In the afternoon students are given two and a half periods' practice in the factory training rooms and in the dairy laboratory.

Dairy practicums: Students are offered training two semesters in compounding rations, feeding cows, rearing calves, milking and many other details in the management of the dairy herd; operating hand separators, and other modern farm dairy appliances, the manufacture of butter and cheese and work in the dairy laboratories.

ENTOMOLOGY.

Students who have completed the entomology offered in the school of agriculture, or its equivalent, may elect course I or course II.

Course I. General entomology. [One semester.]

Structure and classification of insects. The dissection of type, life history and habits of leading forms. Each student is required to make a collection of at least fifty insects.

Course II. Economic entomology. [One semester.]

Lecture upon injurious insects of Minnesota and best methods of combating same. The use of insecticides and spraying machinery. Beneficial insects.

Course III. Forest entomology. [One semester.]

The students in this course must have a thorough, practical training in elementary entomology and economic entomology in order to put into practical use in field work the principles to be learned in both of these courses. He must take course I at some time during his course in forestry, which is to be followed by course II; the two, however, can be taken together if the student's time permits. The student will be directed in a special study of insects affecting the forest and will be encouraged in doing field work, in collecting, identifying, and in the life history of forest insects.

Open only to students in the forestry course.

Course IV. Comparative anatomy and histology of insects. [One semester.]

A detailed study of structure of representatives of different orders of insects.

Six periods of laboratory work and one lecture. Must be preceded by course I or its equivalent.

FARM STRUCTURES.

Lectures and practicums in designing and construction of farm barns, farm houses, silos, outbuildings and conveniences; cement floors, walls, troughs; painting farm buildings; farm water systems, wells, cisterns, tanks; house heating and plumbing systems.

HORTICULTURE.

Equipment. In the college course in horticulture students are expected to avail themselves of the excellent facilities afforded by the nurseries, orchards, gardens and forest garden of University farm and the collections in the museums of the University. They will also find that the vicinity offers many especially good lessons in nursery work, landscape gardening, fruit growing, vegetable gardening and greenhouse management.

Course I. Fruit growing. [One-half semester.]

Lectures. The study of the geography of fruit growing; outlook for fruit growing, planting, tilling and fertilizing of fruit lands; diseases and insects injurious to fruits, spraying, harvesting, and marketing varieties of vegetables.

Course II. Vegetable growing. [One-half semester.]

Lectures. Geography of vegetable growing, tilling and fertilizing vegetable lands, irrigation and rotation of crops, seed growing and seed testing, vegetables under glass, pollination, diseases and insects injurious to vegetables and their prevention, harvesting and marketing varieties of vegetables.

Course III. Green houses and their management. [One-half semester.]

Lectures and laboratory work. Green house construction and management, temperature, soil, watering, benches, propagation by seeds, cuttings, layers and graftage, prevention of diseases and extermination of insects injurious to vegetables, rest and growth periods of plants, plants for greenhouse cultivation.

Course IV. Nursery work. [One-fourth semester.]

Lectures and laboratory work. Seedage, layerage, cuttage, graftage, planting, pruning, thinning, storage of nursery stock, tillage of nursery lands, insects, diseases injurious to the nurseries and their prevention.

Course V. Plant breeding. [One-half semester.]

Lectures and laboratory work. The fact and philosophy of variation; crossing of plants, origination of domestic varieties.

Course VI. Floriculture. [One-half semester.]

This course will include the work outlined in course III, but in addition instruction will be given in the growing of flowers in the open borders in summer, and practical work in this line will be required.

Course VII. Pomology. [One semester.]

Course VIII. Landscape gardening. [One semester.]

A general course in the principles and practice of landscape gardening.

VETERINARY MEDICINE AND SURGERY.

The new veterinary building gives ample facilities for laboratory and clinical work. The hospital furnishes a variety of cases for study and demonstration. The dissecting room affords material and opportunity for studying the digestive organs and locomotor apparatus, and museum materials are being collected.

Instruction is given by text-book, lectures, collateral reading and by practice work in the hospital. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal. Anatomy of the digestive organs and the higher physiology of digestion are given prominence in this work. Theory and practice of medicine are carried further than in the school of agriculture course. Infectious diseases of domestic animals are studied with references to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses, doses and methods of administration. The work in this department continues through two semesters.

Course I. Anatomy. [One-half semester.]

Comparative anatomy of the digestive organs, dissection, collateral reading and recitation.

Course II. Body nutrition. [One-half semester.]

This is an advanced study of the veterinary physiology of digestion, taking up the digestive fluids, nervous mechanism of digestion, absorption and digestion of grains and fodders. It also includes a study of body nutrition, body income and expenditures, sources of heat supply and heat loss, and metabolism. Veterinary physiology, by F. Smith, is used as a text and guide for this work in course II, but students are required to do collateral reading.

Course III. Anatomy. [One-half semester.] '05-'06.

Bones, articulation and muscles of the limbs by dissection, reading and recitation.

This course includes shoeing, diagnosis and treatment of common forms of lameness.

Course IV. Diseases of domestic animals. [One-half semester.] '05-'06.

Lecture and text book work on the diagnosis and treatment of common diseases; common medicines in their doses, uses, dangers and methods of administration.

THE COURSE IN FORESTRY.

The course in forestry in the college of agriculture has been established in response to urgent calls for instruction in this subject. Forestry is really a branch of general agriculture and means the cultivation of forest crops, the same as agriculture means the cultivation of food and other crops. Its object is to produce the greatest amount of serviceable mate-

rial on the soil in the shortest time. It is also a business and contemplates business methods.

EDUCATIONAL OPPORTUNITIES FOR FORESTRY.

There are many and obvious reasons why instruction in forestry is especially adapted to fit in with the courses offered in a large University. It will be noted that this course offers to students not only studies which will fit them especially for forestry, but will fit them for general service. At present there is little forestry work undertaken by the state of Minnesota except that of fire protection, but the outlook seems to warrant the statement that the next few years will see much undertaken that will need the assistance and direction of properly trained foresters. Perhaps there is no situation where a forestry school has more natural advantages than here, as this state is still one of the largest lumber producing states, and the opportunities of seeing lumbering carried on in the best manner are most excellent. The establishment of the Chippewa Forest Reserve and its management by the Bureau of Forestry give opportunities which few other sections possess to study the best methods of forest management. The Minnesota Forest Reserve Board has recently acquired twenty-one thousand acres of timber land which it proposes to develop as a state forest and game preserve. In its development, it is expected that student help will be used as far as possible. Opportunities are here offered to see, and in many cases to take part in the scaling and estimating of timber, and to work in lumber camps for good pay at practical lumbering operations.

In addition to these general facilities and all of the opportunities offered by the University, students in the forestry course have all the privileges of the collections in the arboretum and forest garden of University farm. The state fish hatchery is nearby and furnishes students excellent opportunities to become acquainted with this important subject, on which a short course of lectures will be given

General C. C. Andrews, the Chief Fire Warden of Minnesota, will give a course of lectures on the prevention and suppression of forest fires—in which work he has been eminently successful.

PLAN OF INSTRUCTION.

The regular course in forestry is a four years' course intended to prepare men to take charge of independent forest

properties, or for the government forestry service, or for positions of teachers.

The first year in this course, for those who enter other than from the Minnesota School of Agriculture, deals with the elementary agricultural subjects that it is important for every manager of rural properties to be familiar with. The forester from the very nature of his surroundings will be largely thrown on his own resources and should be capable of advising as to the best way of managing the farms or grazing lands that are almost always included in large forest properties. The sophomore year and one-half of each of the junior and senior years are devoted to the study of the basal natural sciences underlying the practice of forestry, and to such academic and engineering studies as seem especially desirable here. While French is made optional with German, it is expected that German will be taken in most cases, as it is the most helpful language for those who are to study forestry literature. An opportunity will be afforded to take Spanish, as it may be especially desirable to those who contemplate entering the Philippine forestry service. One-half of each of the senior and junior years are devoted to the study of technical forestry, an important part of which consists of field work and excursions. Every student is required before graduation to take four weeks work in some approved lumber camp, so as to become familiar with common lumbering operations.

Especial emphasis is laid on the value of field work and excursions. This consists in excursions to nearby forests; to lumber camps, saw mills, wood manufacturing and paper mills; to the Boom Company's works on the Mississippi river; to nearby nurseries, and it is expected that arrangements will be made which will afford an opportunity for students to visit some of the forests of Montana, Idaho and Washington at a very low rate. Excursions are also frequently made in connection with the study of botany, geology, zoology (and nursery practice).

OUTLINE OF COURSE IN FORESTRY.

FRESHMAN YEAR.

Students entering the forestry course will be required to take the freshman year the same as other students of the college of agriculture.

SOPHOMORE YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Botany, short, [3]	Botany, short, [3]
Chemistry [3]	German or French [3]
German or French [3]	Trigonometry [3]
Agricultural physics [2]	Agricultural physics [2]
Rhetoric [1]	Rhetoric [1]
Military drill [2]	Military drill [2]
Forest entomology [3]	Economic zoology [3]

JUNIOR YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Botany, taxonomy [3]	Plant ecology [3]
Industrial botany [3]	Law, elements of contracts [1]
Forest influence and utility [2]	Taxonomy [3]
Forest by-products [2]	Wood technology and diseases of wood [3]
Lumbering [2]	Forest mensuration and valuation [3]
Surveying [3]	Sylviculture [2]

SENIOR YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Geology [3]	Geology, III and IV, [3]
Sylviculture [3]	Forest economics [3]
Elements of economics [3]	European forestry [1]
Vegetable pathology [3]	Forest administration [2]
	Forest protection [2]
	Fish culture, game protection (lecture) [1]
	Thesis, seminary in reading forestry literature [2]

Practicums in forestry: Four practicums are required in the course in forestry, viz.: In forest exploitation, forest working plans, forest mensuration, nursery practice. A thesis must be presented in each of the four subjects, giving the results of personal observation.

Forest influence and utility: Influence of forests on precipitation, surface and sub-surface run-off and on springs, on frost, on winds and wind storms.

Forest mensuration and valuation: Methods of determining the volume of felled and standing trees, of whole forest growths; timber estimating. Determining the rate of increase in single trees and forest areas, determining present and future money value of forests.

Lumbering: The harvesting of forest products, logging—including transportation, milling and preparation of the wood for market.

Sylviculture: (a) Sylviculture characteristics of trees, methods of regeneration, improvement cuttings, nursery practice. (b) Characteristics of the great typical forest areas of the world.

Forest economics. History of development of modern forestry, forest conditions here and abroad, relation of the state to forests, forest policies of foreign nations.

Forest administration. A working plan and rules of management for a specified forest area; state and national forest policy.

Wood technology and diseases of wood. Study of the characteristics of commercial woods and their uses. Impregnation of woods, fuel value of woods.

Chemistry of forest by-products. This course will be found outlined under the head of chemistry, course IX, (page 20).

Forest entomology. (This course will be found outlined on page 23.)

European forests. Lectures on the condition in European forests.

Forest protection. Protection of the forest against trespass, fire, insects and diseases; method of preventing washing of soils.

COURSE IN HOME ECONOMICS.

Purpose and scope. The courses in home economics offered in the college of agriculture are open to graduates from the school of agriculture who have taken the work of the intermediate year, and to graduates of approved high and normal schools. It is intended to bring to the vocation of home making the same kind of help which the course in agriculture brings to the business of farming. Aside from the universal need of education of this character there is a marked and increasing demand for trained women to fill institutional positions, not only as special teachers in the several divisions of home economics, but also in adminstrative positions as competent supervisors of supplies and of hygiene where large numbers are cared for in collective-house-keeping.

An especial effort is being made to train women to teach Domestic Science and Domestic Art in colleges, high schools, consolidated rural schools, and in other institutions where girls attend school.

A four year course as offered in home economics, leading to the degree of Bachelor of Science in Home Economics. In addition a short two years normal course (page 31) is offered in home economics, which includes all the special technical

subjects given in the four years course, but does not include the required general cultural studies. Those who complete this course receive a certificate.

Graduates of other reputable colleges can here secure a Bachelor's degree by devoting two years to the subject of Home Economics. The major work must be done in Home Economics and one or both of two minors must be completed under the advice of the college committee, in one of the other divisions of the College of Agriculture, or in the College of Science, Literature and the Arts.

COURSE OF STUDY IN HOME ECONOMICS.

FRESHMAN YEAR.

Division "A" required for those who are graduates of the school of agriculture only.

FIRST SEMESTER.	SECOND SEMESTER.
Mathematics [4]	Mathematics [4]
German or French [4]	German or French [4]
Drawing [4]	Drawing [4]
Geology, historical [4]	Chemistry [2]
Rhetorical work [1]	Rhetoric [4]
Physical training [2]	Physical training [2]

FRESHMAN YEAR.

Division "B."

For graduates of approved high schools or others of equal standing. Students in this division take part of their work in classes of the school of agriculture. For descriptions of these courses, see statement under School of Agriculture.

SEPTEMBER.

Agriculture [4]	Cooking [4]
Dairy chemistry [4]	Laundry work [2]
Fruit growing [4]	Sewing [4]
Home management [2]	

FIRST TERM.

Dairying [2½]	Forestry [2]
Agricultural chemistry [5]	Physical culture [2]
Fruit growing [2]	Cooking [2]
Entomology [5]	Social culture [1]
Physics [2]	Sewing [2]
	Household art [1]

SECOND TERM.

Vegetable gardening [2]	Economics [3]
Plant propagation [3]	Cooking [2]
Domestic chemistry [5]	Home economy [1]
Drawing [2]	Sewing [2]
Dairy husbandry [2]	Meats [1]
	Domestic hygiene [1]

LAST HALF OF SECOND SEMESTER.

Bookeeping [4]	Cooking [4]
Poultry [3]	Sewing [4]
Chemistry [4]	Live stock [2]

SOPHOMORE YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Chemistry [4]	Chemistry [3]
German or French [3]	German or French [3]
English literature [3]	English literature [3]
Botany or zoology, short, [3]	Botany or zoology, short, [3]

JUNIOR YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Domestic economics (course I) [2]	Agricultural elective [2]
Domestic science (course III) [4]	Domestic science (course I) [4]
Domestic art (course I) [4]	Logic [4]
Psychology [4]	English literature, modern English prose [3]
Elective [4]	Elective [3]
Bacteriology [1½]	

SENIOR YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Physiology [3]	Academic elective [3]
Domestic economics [3]	Domestic art [4]
Domestic science (course II) [4]	Pedagogy, philosophy of education [3]
Philosophy—principles of ethics [2]	Floriculture or other horticulture [2]
Elective [4]	Elective [3]
History—American biography [3] or English literature [3]	Physiology [3]

NORMAL COURSE IN HOME ECONOMICS.

(Two-year course leading to a certificate.)

FIRST YEAR.

The same as for Division B of Freshman year, see page 30.

SECOND YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Home economics (course I) [1½]	Domestic art [3]
Domestic Science (course III) [1½]	Domestic science (course I) [3]
Bacteriology [1½]	Rhetoric [3]
Domestic art (course I) [3]	Pedagogy [3]
Rhetoric [3]	Physiology [3]
Physiology [3]	Practice teaching [1½]
Practice teaching [1½]	Botany (short) [3]
Pedagogy [3]	Physical training [3]
Botany (short) [3]	
Physical training [3]	

When approved by the dean and college committee, other subjects given in the college of science, literature and the arts, or in the college of agriculture, may be substituted for the prescribed subjects in the course in home economics.

Women who are sufficiently advanced may study music or art during the junior or senior years, provided that no student may receive more than two semesters' credits in music and art together.

EQUIPMENT.

The Woman's Building contains convenient rooms for the students, with heat, light and water supplied under the best hygienic conditions, while attractive reception rooms give opportunity for a refined social life. The dining room is in a separate building and under competent supervision.

The class rooms and laboratories of the school of agriculture, also the equipment of the state experiment station, are available for purposes of instruction and research.

The courses in physical and biological sciences, in English language and literature and in philosophy and history, which are given in the college of literature, science and the arts, are open to students taking this course, as are also the college laboratories and the courses given in agriculture.

The class room devoted to instruction in sewing, garment drafting and the judging of textile fabrics is commodious, well lighted and furnished with the usual accessories, including collection of vegetable and animal fibres showing the successive stages in manufacture from the raw material to the finished fabric. The school museum of birds of Minnesota is utilized in the study of color and its combinations.

The rooms for instruction in cooking, dining room service and laundering, contain the necessary appliances for manual practice and for demonstration lectures. Specimens of manufactured foods, samples of cooking, and laundering utensils and materials and of dining-room and kitchen furniture, are provided. The facilities of the city markets give practice in marketing. The proximity of Minneapolis and St. Paul, in which are found large flour mills, manufactories of cereal foods, canning and pickling factories, and other establishments which prepare food stuffs, make it possible for the classes to visit many places where facts of value are learned. The large public dining-rooms with their kitchens, and the commercial laundries also offer opportunities for gaining valuable practical knowledge in these branches of household science.

The library of the college of agriculture contains a carefully selected collection of books relating to the subject of home economics.

COURSES OF INSTRUCTION IN HOME ECONOMICS.

CHEMISTRY.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. This work is taken along with the classes in the course in agriculture, and includes courses I and II, outlined on page 18. Should the student desire, special facilities are offered for advanced elective work in the Chemistry of Foods, course IV, and the analysis of foods, course VI. Nutrition investigations, including the digestibility of foods, the chemical changes which take place in cooking, and the losses in the preparation of foods form a part of the Experiment Station work; this offers an opportunity for students to study methods of investigation relating to human food problems. Laboratory practice is also offered to advanced students in the study of household problems in which chemistry is involved. Special classes are also formed for the study of dietary problems.

ENGLISH LANGUAGE AND LITERATURE.

The courses in English language and literature are taken in the college of science, literature and the arts.

The scientific movement. (a) This course will take up the study of Darwin, Tyndall, Huxley, Spencer and other well known scientists, from a literary point of view. (b). Influence in the English literature of the nineteenth century.

Literary criticism. A study of development of method and view in the critical appreciation of literature.

Modern English prose. A study of the present literary vernacular in its best examples.

DOMESTIC ART.

A course of study is provided in those branches which are related to healthful and appropriate clothing for the body and to household decoration. The work is taken up in the junior and senior years. It is not confined to sewing or actual home adornment, but covers a number of branches of hand work connected with the home and adapted to the public schools and to industrial education. Needlework, raphia work, weaving, basketry, cord work, crocheting and knitting are included. Each subject is considered in its simplest form for

teaching very young children, and also in its possibilities of greater skill for more advanced grades.

Weekly lectures on related subjects are given. Historic costumes are studied in this manner, with lantern views of costumes worn during noted epochs. Their values are compared and designs selected showing possibilities of adaptation to modern dress.

Course I. A study in textiles.

Animal and vegetable fibers, weaves and dyes, testing fabrics for household use and personal wear, the hygienic values of various fabrics, harmony of color. This course is designed especially to assist the teaching of sewing in graded schools, and includes the preparation, explanation and making of models suited to grade work in the public schools.

Course II. Design and garment drafting.

In the senior year the student is required to design and draft children's and adults' garments, and to write a thesis on some subject pertaining to domestic art.

DOMESTIC ECONOMICS.

The lectures are intended to give breadth, strength and thoroughness to the concept of home.

Course I. The evolution of the family.

Lectures twice a week during the first semester of the junior year. The evolution of the family from primitive conditions, the family as a social and economic institution, the relation of the home to civic life.

Course II. Home administration.

Lectures twice a week during the first semester of the senior year. The organization of a home, generic lines of expenditure; domestic service, disposal of waste, the home as a place and an opportunity for the right development of the physical and spiritual natures.

Theses. The theses required in the junior and senior years are upon some one special branch of domestic economics—distribution of income, home sanitation, hygienic furnishing, household fabrics, food, et cetera, and are intended to familiarize the student with the best sources of information upon the subject; a bibliography of the subject treated is required.

DOMESTIC SCIENCE.

This work is designed especially to prepare women for home-makers and teachers. It is a continuation of the instruction given in the Agricultural High School, but is more elaborate and goes much more into detail.

Normal students are required to study methods of teaching, and to direct some class work under an instructor. The object of such training is to have the graduates understand the principles under lying successful work in the school room, that they may be able to create for their pupils a wholesome atmosphere and foster self activity in the school room because of their own efficiency.

Course I. Food economics. [One semester.]

Selection of food materials: (1) Marketing; buying by sample; cost and value; quality as to freshness, flavor, etc. (2) Storage and care of foods, care of cupboards, cellars, refrigerators. (3) Selection, preparation and serving of foods for large numbers; equipment of large kitchen, serving rooms and dining rooms. (4) Kitchen practicums, arrangements, equipment and methods of directing practice work in cooking.

Preparation of foods: (1) Meat products, as beef tea, beef powder and beef extracts; (2) Cereal products and materials made from flours and meals, methods of aerating dough, leavening agents, etc. (3) Manufactured beverages, as cocoa and koumiss, matzoon, etc. (4) Condiments and spices; (5) Confections, as candies and sweetmeats; (6) Sweets, as sugars and syrups; (7) Commercial bakery products, as breads, biscuits, crackers, wafers, etc. (8) Preserving by drying, canning, refrigerating; and with preservatives, salts, sugars, spirits, fats and acids.

A thesis with bibliography on some special topic of household science is required.

Course II. Management of kitchen and dining room. [One semester.]

1. The kitchen:
   a. Kitchen equipment.
   b. Kitchen sanitation.
   c. Labor saving devices.
   d. Disposition and utilization of kitchen wastes.
2. The dining room:
   a. Equipment, furniture, decorations, china, silver, glassware and linens.
   b. Management; setting the table; garnishing and table decorations.
   c. Table service; reception refreshments; formal dinners, etc.
3. Household inventories.
4. Bills of Fare and selection of food for the dietary, in rural homes, in urban homes, in public institutions, in boarding houses, in restaurants and hotels,
5. Fancy Cookery; meat dishes, vegetable dishes, fruit dishes, pastries, ices, candies, sweetmeats, chafing dish cookery.

Course III. Laundering. [One-half semester.]

Removing stains; dyeing; setting colors; cleaning delicate fabrics, as silks, laces and fine wools; the use of cleaning agents; as soaps, volatile oils, and other chemicals; starches and bluing.

Commercial laundering and cleaning; power washing and ironing machinery; drying apparatus, etc.

HISTORY.

The courses in history are taken at the University in the college of science, literature and the arts.

English constitutional history. The course begins with about six weeks of introductory work on the history of western Europe from the barbarian invasions to the treaty of Verdun. The remainder of the year is devoted to a study of English constitutional history from the Anglo-Saxon conquest to the accession of the House of Hanover. Continental history will be touched upon at various points where its connection with English history makes it necessary.

Studies in American biography. In this course the work will each year center about the political activity of a single important character. In the choice of a subject two points will be especially borne in mind.

1. To select a character not only important per se but representative of some great historical movement or idea.

2. To select one who has left an abundance of material, valuable not only for his own part but throwing light upon the action of others.

PHILOSOPHY.

The courses in Philosophy are taken in the college of science, literature and the arts.

Descriptive psychology. This course is intended to serve as a general course in psychology, the work consists of the study of a text supplemented by lectures and demonstrations and by the preparation of papers on some psychological topic.

Logic. A study of the nature of knowledge and the principles of formal logic. Jevons' lessons in Logic will be used supplemented by lectures and exercises.

Principles of ethics. An introductory course, comprising a study of the distinction between moral and non-moral phenomena, an analysis of voluntary conduct, and a discussion of the nature of conscience, the meaning of right and wrong, the purpose of life, human responsibility, and the authority of moral law.

Aesthetics. A study of the nature and principles of beauty, and a discussion of the place and function of art in life.

The philosophy of education. The purpose of this course will be to define the purpose of education and the principles which govern in preparing the mind and character of youth for the duties of life. It will include topics, as the following: The influence of physical development upon the mental and the recognition of these facts in education. The order of mind development, and the bearing this has upon matter and method in teaching. The recitation, its purpose and the principles that govern in conducting it.

The School of Agriculture

FACULTY

Cyrus Northrop, LL. D., *President.*
William M. Liggett, *Dean.*
Dexter D. Mayne, *Principal, Mathematics, General History, Economics.*
Samuel B. Green, B. S., *Horticulture, Forestry.*
William Robertson, B. S., *Agricultural Physics.*
J. A. Vye, *Penmanship, Accounts.*
Harry Snyder, B. S., *Agricultural Chemistry, Soils.*
T. L. Haecker, *Dairy Husbandry.*
M. H. Reynolds, M. D., V. M., *Comparative Physiology, Veterinary Science.*
J. M. Drew, *Registrar, Blacksmithing, Poultry.*
Andrew Boss, *Agriculture, Animal Husbandry.*
William Boss, *Carpentry, Power Machinery.*
Juniata L. Shepperd, M. A., *Cooking, Laundering, Home Economics.*
Margaret Blair, *Sewing, Household Art.*
George H. Morgan, Major 9th Cavalry, U. S. Army, *Military Science.*
Frederick L. Washburn, M. A., *Zoology, Entomology.*
Catherine Comfort, B. L., *Preceptress, English.*
Edith Snell, B. L., *Algebra, Geometry.*
W. L. Oswald, *Agricultural Botany.*
Karl A. Machetanz, B. A., *Director of Gymnasium, History and Arithmetic.*
Alvah M. Bull, *Drawing, Farm Buildings.*

ASSISTANT INSTRUCTORS.

John A. Hummel, B. Agr., *Agricultural Chemistry.*
Mary L. Bull, *Cooking, Laundering.*
Grace L. Whitridge, *Physical Training.*
Coates P. Bull, B. Agr., *Agriculture, Rural Engineering.*
Le Roy Cady, *Horticulture.*
A. G. Ruggles, M. A., *Entomology.*
M. Estelle Cook, *English.*
Floy Kesson, *Music.*
C. C. Lipp, D. V. M., *Comparative Physiology.*
D. A. Gaumnitz, *Animal Husbandry.*

Committees, School of Agriculture

Library: Mayne, Reynolds, Snyder, Comfort, McIntyre.
Examinations and Registrations: Robertson, Drew, Snell, Bull, Hummel.
Catalog: Vye, Robertson, Snyder.
Military Drill: Morgan, Green, Haecker.
Entertainment: Mayne, Comfort.
Program: Andrew Boss, Drew.
Health: Reynolds, Mayne, Comfort, Washburn.
Dairy School: Haecker, Wm. Boss.
Short Course for Farmers: Drew, A. Boss, Green.
Co-operative Societies: Vye, A. Boss, Robertson.

CLASSIFICATION OF STUDENTS.

No student with incomplete C or preparatory work will be classified as an A.

No student with incomplete preparatory work will be classified as a B.

No student with incomplete C or preparatory work will be made a commissioned military officer.

STUDENTS IN DORMITORIES.

The Principal of the School of Agriculture has charge of the boys in their dormitory and social life, and the Preceptress has charge of the girls in their dormitory and social life.

From 8:15 a. m. to 4:30 p. m. students not at recitations or chapel are expected to be in their rooms or the library studying or reading, also after 7 in the evening.

The rooms shall at all times be quiet, especially in the evening, so that no student may be disturbed.

The Cadet officers shall make daily inspection of the boys' dormitories, under proper supervision of the instructors.

HOLIDAYS.

There will be no regular class on Washington's birthday, February 22nd, but the day will be observed by appropriate exercises.

The School of Agriculture

TIME OF OPENING.

The School of Agriculture opens October 2nd, 1905, and closes March 21st, 1906. The fall term closes at noon, Friday, December 22nd, and the winter term begins Tuesday, January 2nd, 1906.

Instruction begins promptly at the opening of each term, and students are required to be present the first day of the term and to remain until the close of the term.

Students are advised to correspond with the registrar of the school, J. M. Drew, St. Anthony Park, Minnesota, prior to coming to the institution, and to make the necessary preliminary arrangements for registration. Students registered in the fall term will not be received after the second day of the winter term, unless a reasonable excuse is presented for the delay.

LOCATION.

The School of Agriculture is located on University Farm, St. Anthony Park, St. Paul, Minnesota, about midway between the business portions of the cities of St. Paul and Minneapolis. Directions for reaching the school are given on page 10. The School of Agriculture is a part of the University of Minnesota and is governed by the University Board of Regents.

PURPOSE.

The School of Agriculture was organized in 1888 with the object of giving a practical education to the young men and women who are unable to pursue the full college course in agriculture. It offers a practical course of study designed to fit young men and young women for successful farm life, and aims to give to its students the necessary preparation for useful citizenship.

COURSE OF STUDY.

The course of study offered covers a wide range of subjects and is largely technical in character, but provision

is made for some instruction in English and mathematics. The course is briefly outlined on pages 15 and 16. Instruction is given in the work shop, laboratories, barns and fields, as well as in the class room. The course requires three winters of six months each for completion, and is co-educational. Much of the work is taken in common by the young men and the young women. Some of the subjects, such as blacksmithing, carpentry, field work, handling grain and machinery are taken by the young men, while the young women pursue cooking, sewing, laundering and household art. The methods of instruction tend to educate students toward the farm instead of away from it, and to develop in them a love for farm life by showing them its possibilities. In this respect the school has been very successful as over 80 per cent of its graduates continue agricultural pursuits.

HOME LIFE ON THE CAMPUS.

The life of the students while attending the School of Agriculture is subject to supervision.

Students residing in the school dormitories are not allowed to leave the grounds without permission.

The home life of each student is carefully guarded, and everything done to promote a healthful moral atmosphere.

The use of tobacco on the grounds, and the use of spirituous liquors of all kinds is strictly forbidden.

Any one not in accord with these restrictions, and not willing to lend a hand toward a strong moral growth should not come to the School of Agriculture.

HOW TO GET TO THE SCHOOL.

Check all baggage to Minneapolis.

Monday and Tuesday, October 2nd and 3d, members of the Y. M. C. A., wearing lettered badges, will be at the Union Station in St. Paul, and at the Union, Milwaukee, Great Western, Soo and St. Louis Stations in Minneapolis, to meet and direct new students. Take the Como-Harriet car from either St. Paul or Minneapolis and get off at Commonwealth avenue. A charge of 25 cents is made for transporting trunks at the opening of the school from Minneapolis. No charge is made for the return of the baggage, at the close of school, provided it is ready to go on the days assigned.

ADMISSION.

All male students are required to have had six months farm practice before entrance.

Parents are advised not to send pupils under fifteen years of age, unless they are unusually proficient in the common branches.

Applicants for admission are examined in English grammar, arithmetic, history of the United States, geography and spelling, unless they present state certificates, or approved county diplomas, showing that they have completed the eighth grade work in these subjects. Students from city or village schools are not admitted until their former school records have been passed upon by the Committee on Registration. These certificates should be presented at least three weeks prior to the opening of school. Applicants, whose home schools do not afford complete instruction in these common branches, may be admitted with not more than two conditions, which must be removed, according to instructions given the student upon admission. State High School Board certificates are accepted for work in English, physiology, algebra, geometry and civics.

REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honorable standing in deportment.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University farm or elsewhere, as shall appear in reports received from responsible sources.

FEES.

With the exception of an entrance fee of $5 to residents, and $10 to non residents, the school makes no charge.

EXPENSES.

The school expenses for the year do not exceed $85. This amount does not include the cost of the required military suit for the young men, traveling and personal expense.

The cost to the student for board, heat, light and laundry is the actual cost of maintaining the table and caring for the

buildings. This has not exceeded $3 per week. Each month's board is paid in advance. The buildings are all lighted by electric lights and warmed by steam. The sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, chair and table.

No deductions in charges are made for absence of less than four days. If students are compelled to be absent for that length of time they are allowed half rates if they make arrangements before leaving.

Text books are furnished at a rental of $1 to students who do not desire to purchase.

Each student is required to pay for breakage of apparatus used in practical work.

A competent nurse is kept on the ground to care for the sick. To meet this expense each student pays 75 cents per term.

For the purpose of supplying, calcimining and painting the sleeping rooms, a reserve fund is created by assessing each one occupying them $2.00.

A deposit of $5 is required of each student, as a guaranty for the return of all books and other articles borrowed.

On entering school the student makes a payment of $26: $12 board; $5 deposit, $1.25 book rent, reading room and gymnasium; 75 cents maintaining nurse; $5 entrance fee; $2 reserve fund.

All male students are required to provide themselves with the prescribed uniform, which consists of navy blue blouse, trousers and cap, and is as neat and economical a dress as the student can obtain. The suit complete, to measure, is furnished under special contract for $11.65.

Each student provides four sheets, one pair of blankets, one quilt, one bed spread, one pillow, three pillow cases, towels, napkins, comb and brushes.

An assignment of rooms will be made at 9 a. m., March 17, which will hold good until 8 p. m. the first day of the following school year. Students wishing to retain their rooms, after vacation, must be on hand when the second term opens, or pay one-half the price of board and room for the time they are late. Students arriving after the dormitories are filled are compelled to find rooms elsewhere, but are allowed a rebate of $3 per month.

STUDENTS' DEBATING SOCIETIES.

Societies for the purpose of improvement in elocution and debate, and for obtaining instruction in the form of lectures, give excellent opportunities for entertainment and culture.

Each student should associate himself with one of these societies as early in his course as possible.

LECTURE COURSE.

During the school year, a lecture and entertainment course, consisting of six lectures and concerts, is given in the chapel at a cost of seventy-five cents for the series. These entertainments are strictly high grade, and furnish a pleasant relaxation from school work, as well as mental stimulus.

The following program, which was provided during the past year, shows the general character of the entertainments:

Through Ireland on a Bicycle Built for One—October 20, Thomas McClary; Africa in Song and Story—November 7, The Kaffir Boy Choir; The Making of Men—December 8, John W. Frizzell; The Reign of the Demagogue—January 25, John Temple Graves; Dramatic Recital—February 13, Chas. F. Underhill; With a Knapsack Through Switzerland and up the Matterhorn Mountain—March 8, Dr. Eugene May.

STUDENTS' CHRISTIAN ASSOCIATIONS.

The Young Men's and the Young Women's Christian Associations have for their objects, social fellowship and moral and spiritual development. To this end two receptions are held each year, and Bible classes are held Sunday mornings at 8:30. A general religious service is held each Sunday at 3 p. m., and a midweek prayer meeting each Wednesday at 6.30 p. m. The associations are non-sectarian, so that all students may find in them an opportunity for Christian activity and mutual helpfulness.

COURSE OF STUDY.

FIRST (C) YEAR.

FIRST TERM.

Agricultural botany [5]
*Drawing [2]
Music
English [5]

*Blacksmithing [2½]
*Carpentry [2½]
Military drill [2]
Agriculture [3]
Gymnasium [1]

or

*Laundering [2]
Physical culture [2]
*Sewing [3]
Social culture [1]
Field agriculture [3]

SECOND TERM.

Agricultural botany [5]
Farm Mathematics [5]
Music or literary society work
Comparative physiology [5]
Study of breeds [5]

*Carpentry [2½]
*Drawing (farm buildings) [2]
*Blacksmithing [2½]
Military drill [2]
Gymnasium [1]

or

*Cooking [2]
*Drawing (farm houses) [2]
Physical culture [2]

SECOND (B) YEAR

FIRST TERM.

English [1]
Agricultural physics [5]
Dairy chemistry [2]

*Dairy husbandry [2½] { Dairy lectures / Dairy practice / Dairy breeds }
Fruit growing [3]
Music
* Farm accounts [2½]

*Stock judging [1]
Breeding [2]
Military drill [2]
Gymnasim [1]

or

*Cooking [2]
Household art [1]
Physical culture [2]
*Sewing [2]

SECOND TERM.

English [1]
Agricultural chemistry [5]
Dairy husbandry [2½] { Dairy stock lectures / Dairy practice / Dairy feeding }
Music
Agricultural physics [5]
Vegetable gardening [3]

Field crops [5]
Military drill [2]
Gymnasium [1]

or

*Cooking [2]
Home management [1]
Physical culture [2]
*Sewing [2]

COURSE OF STUDY—*Continued.*

THIRD (A) YEAR

FIRST TERM.

Agricultural chemistry [7]
Forestry [3]
Music, Chorus and Quartettes
Entomology and zoology [5]
Poultry [3]
Algebra (5) Optional

Handling grain and machinery [1]
*Veterinary science [2½]
Gymnasium [1]

or

*Cooking [2]
*Sewing [2]

SECOND TERM.

Civics or geometry [4]
Plant propagation [3]
Algebra [5] Optional

Dressing and curing meats [1]
*Stock judging [1]
Feeding [3]
Soils and fertilizers [5]
*Veterinary science [2½]

or

Meats [1]
Home economy [1]
*Cooking [3]
Domestic chemistry [3]
Domestic hygiene [1]
*Sewing [3]

Figures in brackets indicate the number of hours per week in which the subject is pursued. All work in subjects marked thus extend through double time in the daily program.

ASSEMBLY.

On each school day at 11:40 a. m. the students assemble in the chapel. After the opening exercises brief talks are given by the principal, members of the faculty, or invited guests.

During the year the list of speakers includes prominent state and national officials, business men, particularly those connected with the agricultural industries, professional men, prominent clergymen of all denominations, educators from other institutions, and successful farmers. It has been found that this plan gives to the students an opportunity to hear men of prominence discuss a wide range of topics, many of which relate to rural and agricultural problems.

Members of the graduating class at times present essays, and discuss topics as assigned.

SCHOOL OF AGRICULTURE—PROGRAM, FALL TERM, 1905.

INSTRUCTORS	8:15–9:00	9:05–9:50	9:55–10:40	10:45–11:30	11:40	1:15–2:00	2:05–2:50	2:55–3:40	3:45–4:30	4:35–5:20
Blair	B Household Art, Sat.	B Household Art, Sat.	A Sewing			C Sewing, Tu., Th. & Sat. B Sewing, Wed. and Fri. B Breeding, Wed. & Th.		C Sewing, Tu., Th. & Sat. A Sewing, Wed. and Fri. B Stock Judging, Friday		
Boss, A.	C Breeds	C Breeds								
Boss, W.		A Power Machinery, Monday				C Carpentry, Tu. or Wed. or Thurs. or Fri. or Sat.				
Bull, A. M.						C Drawing, Tu., Wed., Th., Fri., Sat.		C Drawing, Tu., Wed., Th., Fri.. Sat.		
Bull, C. P.			C Field Agr., Tu.. Th., Sat.	C Field Agr., Tu., Th., Sat.						
Comfort		B English Tues.	Gram.				B English, Tu. or Sat.	C Social Culture, Fri.	B English, Tu. or Thur.	
Cook	C English	G English	C English	C English						
Drew	A Poultry, Tu.,Wed.Fri.					C Blacksmithing, Tues. or Wed. or Thurs. or Fri. or Sat.				
Green	B Fruit Growing, Tu., Wed., Thurs.	B Fruit Growing, Tu., Wed., Thurs.	B Fruit Growing, Tu., Wed., Thurs.	B Fruit Growing, Tu., Wed., Thurs.		A Forestry, Tu.,Wed, Th.			A Forestry, Tu., Th.,Sat.	
Haecker						B Dairy Lecture, Tu. and Sat.	Dairy Practice, Tues. or Thurs. or Sat.			
Hummel		B Dairy Chem., Fri. and Sat.	B Dairy Chem., Fri. and Sat.	B Dairy Chem., Fri. & Sat.						
Kesson									B Music, Tu. and Th.	A Music, Sat. B MusicTu. & Th. C Music, Wed&Fri
Machetanz	A Gym. Thurs.	Arithmetic, Tu., Wed. Fri. Sat. C Gym., Th.	C Gym., Thurs.	C Gym., Thurs.		G History, Tu.,Wed.,Th.,Sat	B Gym., Tu. or Th. or Sat.			
Mayne		Farm Math'tics	Farm Mathem'tics			C Arithmetic	C Arithmetic	C Arithmetic		
Morgan										A Drill B Drill, Wed & Fri C Drill, Tu. & Th.
Oswald	C Botany, Tu.,Wed.,Fri.,Sat.	C Botany, Tu.,Wed.,Fri.,Sat.	C Botany Tu, Wed, Fri, Sat.	C Botany Tu, Wed, Fri, Sat.						
Reynolds		C Physiology	C Physiology			A Veterinary Science, Wed. and Fri.				
Robertson	B Physics	B Physics	B Physics	B Physics, H. S.						
Shepperd						C Cooking,Tues. and Wed. A Cooking, Fri. and Sat.		C Cooking, Tu. and Wed. B Cooking, Fri. and Sat.		
Snell	G Geom.		G Algebra	A Algebra						
Snyder	B Agr. Chem.	A Agr. Chem.					A Laboratory Work, Agr. Chemistry, Tues. and Thurs.			
Vye						B Farm Accounts		B Farm Accounts		
Washburn			A Ento'ology and Zoology	A Ento'ology and Zoology						
Whitridge	B Phys'l Training Wed. & Fri.	B Phys'l Training Wed. & Fri.	C Phys'l Training Wed. & Fri.	C Phys'l Training Wed. & Fri.						
Wilson	C Agric'ture, Tu., Th., Sat.			C Agric'ture, Tu.. Th., Sat.		A Handling Grain and Machinery, Sat.				

ASSEMBLY.

INSTRUCTORS	8:15–9:00	9:05–9:50	9:55–10:40	10:45–11:30	11:40	1:15–2:00	2:05–2:50	2:55–3:40	3:45–4:30	4:35–5:20
Blair	A Sewing, Tues.		A Sewing, Fri.		ASSEMBLY.	B Sewing, Wed. and Fri.		A Sewing, Tues., Thurs. and Fri.		
Boss, A.	C Breeds	C Breeds				A Feeding, Wed. Th, Sat.	A, D. and C. Meats, Tues.	A Stock Judging, Tues.		Meats, Wed.
Boss, W.						C Carpentry, Tues. or Wed. or Thurs. or Fri. or Sat.				
Bull, A. M.						C Drawing, Tu., Wed., Thurs., Fri., Sat.		C Drawing, Tu., Wed., Thurs., Fri,, Sat.		
Bull, C. P.	B Field Crops	B Field Crops								
Comfort			Gram.			B English, Fri.	B English Sat.	B English, Fri.		
Cook	G English		C English	C English						
Drew						C Blacksmithing, Tues. or Wed. or Thurs. or Fri. or Sat.				
Green	B Veg. Gard. Wed, Th, Fri.	B Veg. Gard. Wed, Th, Fri.	A Plant Prop., Sat. B Veg. Gard. Wed., Th., Fri	A Plant Prop., Sat. B Veg. Gard., Wed, Th, Fri.				A Plant Prop., Lab. Work, Sat.		
Haecker						B Dairy Lec. Tues. & Sat.	Dairy Practice, Tues. or Thurs. or Sat.			
Kesson										A Music, Sat. B Music, Tu. & Th. C Music, Wed. & Fri
Machetanz	C Gym., Thu. Arithmetic, Tu, W. F, Sat.		C Gym. Thurs.	C Gym., Thurs.		G History, Tu, W, Th, Sat	B Gym. Tues. or Thurs. or Fri.			
Mayne			A Civics, Tu, W, Th, F.	G Economics Tu, W, Th, F.						
Morgan										A Drill B Drill, Wed. & Fri C Drill, Tu & Th.
Oswald	C Botany Tu, W, F, Sat	C Botany Tu, W, F, Sat.	C Botany, Tu., W., F., S.,	C Botany, Tu, W, F. Sat.						
Reynolds			C Physiology	C Physiology			A Veterinary Science, Wed. and Fri.			
Robertson	B Physics	B Physics	B Physics	B Physics						
Shepperd.	A Dom. Hygiene, Wed.		B Home Manag't, Sat.	A Home Econ'my, Sat		A Cooking, Wed., Thurs. and Sat.		B Cooking, Wed, Th. & Sat. C Laundering, Tues. & Fri.		
Snell	A Algebra	G Geometry	G Algebra	A Geometry Tu, W, Th, F.						
Snyder	A Dom Chemistry Th.. Fri., Sat.	A Soils and Fertilizers	B Agric'l Chemistry	B Agric'l Chemistry			A Lab. Work, Agr'l Chemistry, Tues. and Thur.			
Vye						B Farm Accounts		B Farm Accounts		
Whitridge	B Phys'l Training Wed. & Fri.	B Phys'l Training Wed. & Fri.	C Phys'l Training Wed. & Fri.	C Phys'l Training Wed. & Fri.						
Wilson	C Agric'ture, Tu., Th., Sat.	C Agric'ture, Tu., Th., Sat.								

Courses of Instruction

AGRICULTURAL BOTANY.

This subject is taught with special reference to its bearing upon the every day problems that present themselves to the farmer and gardener. It is profusely illustrated with plants and flowers from the greenhouses and nursery. Some instruction is given in the use of the compound microscope. Students are thus enabled to study intelligently, in an elementary way, the tissues of plants. By this means they get a clear idea of the general prinicples of plants structure and vegetable physiology.

AGRICULTURAL CHEMISTRY.

In agricultural chemistry one term is given to the study of the elements and compounds which are of most importance in agriculture. This work is planned to prepare the student for intelligent study of the subject of the chemistry of foods, soils and fertilizers, and at the same time to familiarize him with the more important chemical changes which take place in every day life. Laboratory practice forms a prominent feature of the work in agricultural chemistry. In the chemistry of foods, the composition of plant and animal bodies, the chemistry of the plant and of its food and growth, the chemistry of animal nutrition, digestibility and value of foods, and the laws governing the economic uses of foods, are some of the subjects considered. The composition and the utilization of farm crops for food purposes, and the application of the principles of chemistry to plant and animal life form the basis of this work.

AGRICULTURAL PHYSICS.

The work in Agricultural Physics does not attempt to cover all of the principles of the subject. It deals with matter from the farmer's standpoint. The laboratory and lecture-room experiments are largely those that have been developed in the class room and are of a more practical nature than those that are found in the text-book. Capillarity finds expression in the soils, specific gravity in determining densities of feeds and other materials on the farm; centrifugal force in correct speeding of milk testers and separators; the law of machines in regulating eveners and selecting farm conveniences, etc.

Static electricity is studied from the point of securing lightning protection; batteries for the purpose of securing the best for sparking gasoline engines; telephones with a view to securing the best rural lines; heat in its relation to house-warming, crop growth, and house, barn and soil ventilation.

Six months are given to the subject.

Students having had a high school training in Physics are allowed credit for three months' work.

AGRICULTURE.

Soils; selecting and planning farms; subduing the fields; drainage; irrigation; fences; roads; buildings; water supply; groves; farm life and the relations of general science in agriculture.

Farm management: Remodeling farm plans; rotation of crops; manuring; production and management of farm manures, green manure crops, and the place of commercial fertilizers in field management in various parts of the state; farm administration, management of fields in relation to fertility, to weeds, to yields, to live stock and to profits. Keeping weeds down by helpful crop rotations, careful field work, and good methods of farming generally; study of botany and habits of the various species of harmful weeds; methods of destroying each class of weeds.

ALGEBRA.

Algebra is optional during the third year. This work covers Wells' New Higher Algebra through simple equations. Special attention is given to literal notation, negative numbers, the equation and factoring.

BLACKSMITHING.

The students are instructed in the management of the forge and fire, and in bending, shaping and welding iron and steel. They are required to make links, rings, hooks, bolts, clevises, whiffletree-irons, tongs, cold-chisels, punches; in short, to become familiar with all the operations necessary to enable them to do their own repair work when they return to the farm. Particular attention is given to rapid and accurate welding and to the shaping and tempering of steel tools. The forges used are such as any farmer can make for himself, and each student is taught to make his own tools, so that he will be able to furnish his shop with very little outlay.

BREEDING.

Students receive instruction in the principles that govern breeding; on the influences that affect heredity and in the care and management of breeding stock. Pedigree receives careful consideration, and each student is required to make out pedigrees of two or more pure bred animals. They are also required to become familiar with methods of keeping live stock records of all kinds.

CARPENTRY.

Instruction is given by means of lectures on the care and use of the common carpenter tools, such as should be found on every farm; also on methods of farm building construction, framing, laying out rafters, stairways, estimating building material, painting, etc. In the carpenter shop students are required to make such exercises as will give them some practice in using carpenter tools. They are required to make mortise joints, splices, drawing boards, hammer handles, eveners, cupboards, etc.

Each student is required to file his own saws, sharpen his planes, chisels, etc., and to lay out rafters for buildings.

CIVICS.

During the last term of the course students receive instruction in this science, and graduate with a good understanding of the origin, necessity, nature and various forms of government, and the machinery employed to carry on public works, establish justice and provide for the common defense; of the organization and management of local institutions, the town, the village, the city, and the county; the manner in which states are created and the affairs administered; the three departments—legislative, judicial and executive—and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relation of the state to the general government; the constitution, and the powers it confers; and the provisions for amendments, are taught. The more important principles of commercial law, including contracts, agency, partnership, corporations, and commercial paper, receive attention. Instruction is also given in the United States method of surveying public lands.

COMPARATIVE PHYSIOLOGY.

During the first year students take one term of applied physiology. This is an effort to connect technical physiology with the necessities of every day life. The work includes a study of the general plan and structure of the body and the various individual tissues of which it is composed; also sources of heat and energy, digestion, and the relation of food materials to the various tissues of the body. Considerable attention is given to diseased and innutritious foods, food adulterations and narcotics. The circulation is studied with especial reference to the relation of the blood and lymph to tissue nutrition and tissue waste.

Accidents, including poisoning, are studied for the purpose of giving a practical knowledge of what to do in emergencies. Considerable attention is given to the subject of clothing, the various materials in use being considered with reference to fitness for special purposes. Some time is also given to the study of common physiology, of the organs of circulation, digestion, respiration, nervous system, and the relations of bacteria to the common diseases, especially such diseases as consumption, typhoid fever, etc. A brief study is also given to the subject of digestion in the lower animals.

The class work is illustrated by means of large charts, skeletons, manikins, and dissections. Important points of difference between human and animal

physiology are pointed out in preparation for the third year's work in the veterinary class. Matters of home and personal hygiene are interwoven with the physiology work.

COOKING.

The course in cooking extends through five terms of the curriculum as given below, with the subjects covered in each term:

(C) Second term—Kitchen management; care of cooking utensils and silverware; measuring and invoicing; cooking vegetables, cereals and breads.

(B) First term—Cooking meats, preserving fruits and vegetables.

(B) Second term—Eggs, beverages, soups, salads and table service.

(A) First term—Marketing and care of foods; dairy dishes, made over dishes, invalid cooking.

(A) Second term—Desserts, food rations, dietaries, confections, bills of fare and dining room.

DAIRY CHEMISTRY.

The chemical and allied changes which take place in the handling of milk and its manufacture into butter and cheese, and the application of these principles to the production of milk and its products form the basis of this work.

DAIRY HUSBANDRY.

Farm dairy lectures.—A course of lectures is given in farm dairying, giving instruction in the care of milk and utensils, explaining the principles involved in creaming milk by the gravity and centrifugal processes and giving full instruction in regard to running farm separators and the manufacture of butter and cheese in the farm dairy.

Dairy practice.—Students receive practical training in the most advanced methods of creaming milk, ripening cream, churning, working and packing butter, the manufacture of sweet curd cheese, and measuring the value of milk by the Babcock test and lactometer. This practice work begins the third week of the first term and continues through the school year.

Dairy stock.—During the last half of the first term students receive instruction in regard to characteristics of the various breeds of dairy cattle, their origin and comparative adaptability for the dairy. Lectures are given upon the points desirable in animals intended for the dairy. The students have practice work in judging dairy stock.

Feeding.—During the second term lectures are given covering both the scientific and practical phases underlying the principles of feeding. Practice work is given in compounding rations and estimating the comparative value of food stuffs.

DOMESTIC CHEMISTRY.

The combination of human foods to form balanced rations, dietary studies of families, cost and value of foods, losses in the cooking and preparation of foods, cereal food products, animal food products, adulterations of foods and their detection, fuels, soaps, dye stuffs and colors, composition of common household utensils, the household water supply, preparation of home made baking powders, bakers' chemicals, composition, food value and characteristics of tea, coffee, chocolate, cocoa, molasses, honey, vinegar and spices, the grading and testing of wheat flour and the chemistry of bread making, form the essential parts of this work.

DOMESTIC HYGIENE.

Several lectures by a physician will be given upon maidenhood, maternity and infancy. These special lectures will be supplemented by the regular lectures which consider the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits as well as upon heredity. The aim is to impress the truth that a knowledge of and obedience to the laws of hygiene are essential to the preservation as well as the restoration of health.

DRAWING.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises, then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, outbuildings, and machinery. As practical subjects for their designs students are requested to bring from home data for plans of buildings needed on their farms. Estimates are made of the amount of material required and cost of construction.

DRESSING AND CURING MEATS.

The instruction given the boys consists of demonstration lectures on the preparation of meat for farm use. They are required in addition to take two weeks' practice in dressing, cutting and curing such meat as is likely to be used on the farm. Work is also given them in selecting and judging fat stock, and in judging dressed meats.

ENGLISH.

(C) The first year's work in English consists of almost daily practice in the simpler forms of composition. Applicants for admission to the C class should be familiar with the inflections of nouns, pronouns and verbs, the definitions and classifications of phrases and clauses and the common case constructions.

(B) Once a week throughout the school year the members of the B class prepare short essays, and submit them for criticism.

(A) At the option of the English Department a series of literary programs will be presented in chapel by the members of the graduating class. The numbers include abstracts of leading magazine articles, biographical sketches, book reviews and selections from fiction; special prominence is given to authors depicting American life.

ENTOMOLOGY AND ZOOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects; habits and life histories of injurious forms with special attention to insect pests found in Minnesota. The nature of different insecticides and methods of application are discussed. The student spends some time in becoming acquainted with the appearance and habits of beneficial insects. Each student must collect fifty insects representing at least twenty-five different kinds.

FARM ACCOUNTS.

The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is taught to keep his accounts, that he may know at any time the profit or loss of any department of his business, and is thus enabled to plan intelligently.

FARM ARITHMETIC.

Instruction in this subject consists of the application of its principles to all kinds of farm problems, where measurements of material, extension, capacity, etc., are required. The student is prepared also to handle with ease the mathematics of the technical courses in the school.

FEEDING.

The principles of feeding as applied to the production of horses, beef cattle, sheep and swine are taught. Special attention is given to the choice and preparation of food for animals during different periods of growth and during the time they are used for breeding purposes and to summer feeding and pasturage. Practice is given in compounding rations that will include in the best manner the food stuffs commonly produced on the farm. Practical lessons in feeding are given at the barns under the supervision of an experienced feeder. Each student thus learns the requirements of each class of stock.

FIELD AGRICULTURE.

Selected portions of agriculture and field crops for girls.

FIELD CROPS.

Place in the rotation; preparation of the land; planting; cultivating; harvesting; storing and marketing of grains, field roots, fiber crops, sugar crops, grasses, clovers and other forage crops; planting, care and use of pastures and meadows.

Laws of heredity and variation; possibility of increasing values; improvement and formation of varieties; general facts as to methods of breeding; specific plans of breeding leading field crops.

FORESTRY.

Includes the consideration of the formation and care of wind breaks and shelter belts; the laying out and planting of home grounds; discussion of the hardiness, habits and value of our native and introduced trees; and the methods of propagating them.

FRUIT GROWING.

Fruit growing is taught with reference to raising fruit for market and in the home garden.

GEOMETRY.

Geometry is offered in the second term of the third year, as an elective in place of civics to those who wish to prepare for a college course. This work covers the first two books of Well's Essentials of Plane Geometry.

GYMNASIUM WORK.

The gymnasium is a large, well lighted, two story brick building. It is well supplied with heavy apparatus for general gymnastic and athletic exercises, together with such appliances as are necessary for the development of a symmetrical body. Besides being fitted up with the finest apparatus, it possesses space and equipment for sprinting, pole-vaulting, hurdling, high and broad jumping, shot putting, etc.

Class work in physical training is required of all undergraduate young men not excused on account of physical disability. Courses are offered on the heavy apparatus, in corrective work, class drills, and athletic training. In addition to the regular class drill, a certain part of which consists in training in athletic sports, the school is represented by a strong basket ball team, a track athletic team, hand ball team, and an indoor tennis team.

HANDLING GRAINS AND MACHINERY.

Practical suggestions for the best methods of harvesting, shocking, stacking and storing of cereal grains. Machinery, adaptation of the various kinds, with reference to the soil, weeds, season, etc.; adjustment with especial reference to durability, convenience in manipulation, etc.

HOME ECONOMY.

The lectures are a study not only of the just proportion between expenditure and income, but of definite proportion in the expenditures made for existence, comfort, culture and philanthropy. A study is made of the sources of income, especially of the income from the farm in the form of house, food and luxuries; the purchase of clothing, household stores and furnishings is considered from the standpoint of the suitable. The relation of cash and credit to cost is also considered. Attention is given to savings and form of investment, a bank account and the use of a check book. Students are required to submit an account setting forth in detail the use of a certain named income expended in the support of a family for one year, embracing not only every item of necessary home expense, but also an outlay made for travel, luxuries, accident, sickness, or other emergencies. The habit of keeping a household account is calculated to strengthen the judgment in the wise use of money.

HOME MANAGEMENT.

The subject includes both housekeeping and home-making, and the instruction is based on the belief that housekeeping is a business as important as it is difficult, and that home-making is the noblest form of human endeavor. The care of the house and household belongings, of the food and the clothing, as well as the ordering of family life are considered in their relation to an adequate plan for home management. To start the student in the right way of becoming mistress of the business of housekeeping and home-making is the end sought. The practical benefit to be derived from the knowledge students gain in the cookery, sewing, dairy, laundry and other classes, is emphasized and shown in its relation to an adequate plan for the daily program for the home.

HOUSEHOLD ART.

Lectures upon house and grounds, noting the distinctive character of the country home; the sanitary conditions involved in the selection of the site of the house; also the influence of the outlook; an elementary study of architec-

ture in connection with planning a house which will provide "a place for everything" required in housekeeping operations and family life; instruction in the fundamental value of color, form and design; training the taste and emphasizing the laws of hygiene that should influence the selection of materials and styles in the finishings and the furnishings of the house.

MEATS.

The instruction given to the girls in the subject of meats pertains to the selection and value of different classes of meat, and to the best methods of curing and preserving.

LAUNDERING.

In the first term of C year several lectures are given and practice work is provided in washing, ironing, starching, polishing, cleaning and pressing clothing.

LIBRARY.

The agricultural library now contains nine thousand books and about seven thousand pamphlets, including reports and bulletins. Aside from the large number of pamphlets and other publications of the different agricultural institutions and societies, a large number of the most important technical and agricultural magazines are kept on file, bringing together all the agricultural literature of any importance.

LITERARY SOCIETY WORK.

Any student belonging to a recognized literary society of the school may receive credit in the course of study for the work done therein by registering at the beginning of the term, and submitting to the teacher in English all essays to be read by such student before the literary society and rehearsing to said instructor all essays, readings, or recitations with a view to correct pronunciation, expression, etc.

MILITARY DRILL.

All male students not physically unfit are required to attend military drill.

Military instruction is intended to be so conducted as to develop a soldier-like bearing and foster a spirit of gentlemanly courtesy, soldierly honor and obedience to lawful authority as well as to familiarize students with battalion maneuvers, guards and the theoretical and practical use of firearms.

The officers and non-commissioned officers are required to be good students in the other departments, soldier-like in the performance of their duties, exemplary in their general deportment and able to pass a creditable examination in drill regulations.

In general, the officers are selected from the "A" class; sergeants from the "B" class, and the corporals from the "C" class.

MUSIC.

A systematic training in music is given and all students are required to take the work unless they already have a credit in it.

Class quartets and octets are organized and trained for aiding in public entertainments in the school.

The Senior Class gives a concert at Commencement time.

PENMANSHIP.

In penmanship the student is taught to write a plain hand with rapidity and ease. Daily drills are given using a free forearm movement.

PHYSICAL TRAINING.

The work done in this department aims at symmetry, co-ordination and control rather than mere physical strength. It is planned to improve the functional activity of the body and to counteract and correct tendencies to incorrect development, especially those resulting from the artificial life of civilization. The work of the beginning class is free hand, based upon Swedish principles, and directed especially to deep breathing, correct carriage and posture. The work of the advanced class includes light apparatus and aesthetic movements for suppleness in action and grace. Vigorous games are given to both classes.

PLANT PROPAGATION.

In this subject the principles underlying the development of cultivated varieties of plants and seed testing are taught; also the propagation of plants by seed, cuttings, grafting, and budding. The work of the class room is illustrated by the orchards, nurseries, forest plantations, gardens and greenhouses on the grounds of the experiment station and by visits to commercial nurseries and greenhouses near by.

POULTRY.

The instruction in this subject will include the following topics: History and characteristics of the leading breeds of poultry; breeding, feeding and management of fowls for eggs and for the market; planning, building and arrangement of poultry houses; managing incubators and brooders. A model poultry house, containing pens of the most improved breeds, incubator cellar, workroom, etc., has been provided, where experimental work and practical instruction are carried on.

SEWING.

Instruction is given in the principles and use of healthful and appropriate clothing and in the needlework of the home. The course provides for five terms' work. During the first term instruction is given in the elements of sewing, including different stitches, seams, hems and the various kinds of mending; also practical talks on the use and care of the sewing basket, touching the history of the various implements used, and upon the textiles used—cotton, wool, linen and silk.

In the second year instruction is given in cutting and making plain garments, drafting underwear, shirt waists and cotton dresses,—taught by a simple method in which only a tape line and square are used.

In the third year the more difficult work of dressmaking is taken up, pattern drafting, cutting and fitting dresses. Lectures are given on the utilitarian and art values of various textiles, and in connection with the selection of materials practical lessons in shopping are given. Attention is paid to harmony in color. A practical aid to the work in this subject is offered by a museum of exhibits. These exhibits are kept in the class rooms and include primitive and modern sewing implements, weaving processes and the various cloth fibres.

SOCIAL CULTURE.

A course of lectures is given on the usages of society, including manners, behavior, the voice, conversation, forms of address. invitations, etc. Suggestions are made in reference to reading, literary taste and the choice of books. Especial stress is given to the thought that the family life ought to be the highest expression of good society, and that next to the power of thinking correctly is the power of approaching others with ease and speaking with tactful directness.

SOILS AND FERTILIZERS.

Some of the topics studied are: The formation of soils, adaptability of crops to different kinds of soils, chemical composition of soils, physical analysis of soils, interpretation of soil analysis, the judging, rating and scaling of soils, alkali soils, acid soils, humus and its relations to soil fertility, the factors governing the increase and decrease of the nitrogen of the soil, farm manures,—their composition and uses, and their action upon soils, green manures, commercial fertilizers, special purpose fertilizers and their use, the influence of different methods of cultivation upon the fertility of the soil, the food requirements of farm crops, the rotation of crops as affecting the fertility of the soil, the income and outgo of fertility from farms where different systems of farming are followed, and the general principles of soil exhaustion and soil improvement. The class room work is supplemented by laboratory practice.

STOCK JUDGING.

Score cards are used to an extent sufficient to familiarize students with that method of judging, and special efforts are made to do systematic and closely critical work in the selection of animals representative of the breeds and for breeding purposes. Living specimens are used and rings made up for the student contests in stock judging. In connection with the work in dressing and curing meats, the judgment passed on live animals for the block is verified by score cards, judgment of the dressed carcasses and by actual block tests. These tests are made by the students and bring out the percentage of meat in each commercial cut of the carcass. The quality of meat is passed upon in this connection by experts, and a careful report made to ascertain the type of animals best calculated for the production of the most meat of the best quality.

STUDY OF BREEDS.

This work covers briefly the market classification of stock; study of animal form, elementary stock judging; the characteristics of the leading pedigreed breeds of horses, beef, cattle, sheep and swine and the environments to which each breed is adapted.

VEGETABLE GARDENING.

Vegetable gardening embraces the study of garden tillage, irrigation, and rotation of crops; transplanting; formation and care of hotbeds; study of garden insects; and the growth of various vegetable crops.

VETERINARY SCIENCE.

During the A year the student takes up a course of study in veterinary medicine, the purpose of which is to fit him for intelligent care of his farm stock. In this course the teaching is done by means of lectures, distribution of mimeographed lecture notes after each lecture, reviews and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of stereopticon charts, manikin of horse, skeleton of horse, and various other appliances.

The lectures consist of a series on each of the following subjects: Elementary anatomy; elementary pathology; cause and prevention of diseases; diagnosis and treatment of common diseases, examination for soundness; and a final short course on common medicines, studying their effects, uses and doses. At the hospital clinics students are enabled to examine and care for a variety of cases and to learn the elements of diagnosis for the more common diseases and forms of lameness.

STUDENTS' TRUST FUND.

The class of 1902 left with the school a fund of $100 "to assist by temporary loans at a reasonable rate of interest, deserving students needing such help, who are not below the B class in the school of agriculture." This fund is in charge of a committee, consisting of the secretary, the principal, the preceptress, and the president of the A class.

THE LUDDEN TRUST.

The Honorable John D. Ludden, of St. Paul, gave the University of Minnesota $5,000 to be held, invested and re-invested by the University, through its Board of Regents, and the income thereof to be collected, received and applied by said Board of Regents to the financial assistance of students of either sex in the school of agriculture. Mr. Ludden delivered into the hands of the regents for the principal sum one Northern Pacific registered prior lien railway land grant gold bond of the denomination of $5,000, payable to the University of Minnesota and its assigns in gold coin, on the first day of January, 1997, with interest at 4 per cent per annum, payable quarter-yearly in like gold coin, the fund to remain so invested until the bond matures, unless by reason of changed conditions a re-investment shall be sooner deemed judicious by the Board of Regents for the safety, conservation or continued

productiveness of the fund. The premium on the purchase of this first grade security was $212.50, and was paid by Mr. Ludden, thus enlarging his donation by that amount.

Mr. Ludden imposes the following conditions: "The beneficiaries must be youths who are residents of the state of Minnesota; they must be and continue of unblemished moral character, and of temperate and industrious habits, and they must be such as by examination and trial shall evince and maintain a taste, habit and aptitude for study and improvement; and any student who shall fail to come, or shall cease to be, within the above conditions shall forfeit all claims to the benefit of such fund. Subject to these conditions the administration of such income is entrusted to the said board of regents, which may make such rules therefor as they may deem judicious."

This fund produces $200 a year. Those wishing to avail themselves of its benefits should apply to the executive committee of the Board of Regents of the University of Minnesota.

Mr. Ludden has since donated another $5,000 for a like purpose so that the income is now $400.

Intermediate Year

For graduates of the School of Agriculture who wish to enter the College of Agriculture.

The course of study in the School of Agriculture extends over three years, and the school year is six months long. This does not give sufficient time for preparation for college work, and it has been found necessary to supplement the course offered in the School of Agriculture by an additional year's work in general academic branches. The subjects offered in the intermediate year can be taken elsewhere in any accredited high school before entering the School of Agriculture. This intermediate year enables graduates of the School of Agriculture to enter the College of Agriculture on the same basis of preparation as students enter other departments of the University. English and mathematics are given prominence in the intermediate year.

The following prescribed course, or its equivalent, taken in some other school, is required of graduates of the school of agriculture, who desire to gain admission to the college of agriculture:

FIRST TERM.	SECOND TERM.
Elementary Algebra [5]	Elementary Algebra [5]
Plane Geometry [5]	Plane Geometry [5]
English [5]	English [5]
General History [4]	Economics [4]

The courses in mathematics for the intermediate year cover Well's New Higher Algebra from simultaneous equations to logarithims; Downie's Higher Algebra, Part 1, and Wells' Essentials of Plane Geometry, beginning with Book III. The work preliminary to these courses is done by the student in the A year in the School of Agriculture.

Students who have taken the elementary algebra and completed plane geometry in the "A" year of the School of Agriculture, are admitted to the freshman class in the College of Agriculture conditioned in English; this condition must be removed during the freshman year.

The course in English extends through both terms. Two periods a week are devoted to composition, with Scott & Denny's Composition-Rhetoric as a text-book, and three to the study of literature, which will also be made the basis of considerable written work. The characteristic works of the following authors will be studied: Shakespeare, Bacon, Milton, Addison, Gray, Goldsmith, Burns, Wordsworth, Lamb, Macaulay, Ruskin, Browning and Tennyson. Individual members will be assigned readings from various other authors.

Short Course for Farmers

FACULTY

WILLIAM M. LIGGETT, *Dean.*
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*
J. A. VYE, *Business Methods.*
HARRY SNYDER, B. S., *Agricultural Chemistry Soils.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinary Science.*
J. M. DREW, *Poultry, Workshop Hints.*
A. BOSS, *Live Stock, Dressing and Curing Meats.*
WM. BOSS, *Farm Mechanics.*
F. L. WASHBURN, M. A., *Insect Enemies.*
COATES P. BULL, B. Agr., *Farm Implements.*
W. L. OSWALD, *Farm Botany.*
D. D. MAYNE, *Parliamentary Practice.*

To meet the needs of men of mature years, who are busy on the farm the greater portion of the year, a special course of lectures has been prepared. Investigations and experiments by scientific men are uniting to produce great changes in the practice of argiculture and the management of live stock. In order to keep up with the times, the farmer must bring himself into close relations with recent investigations, discoveries and methods relating to his business. This course is organized to meet just this need, and to bring within reach of the busy farmer the results of the latest methods and experiments.

This course will open January 9, 1906. During the first six weeks a course of lectures on subjects of vital interest to Minnesota farmers will be given as outlined on the following pages.

Following the lecture course two weeks will be devoted to judging grains, dairy stock and live stock, including horses, cattle, sheep and swine. The time will be divided as follows: February 19, 20, 21, corn and grain judging; February 22, 23, dairy stock; February 24, 26 and 27, sheep and swine; February 28 and March 1, beef cattle; March 2 and 3, horses.

Work in lecture room, class room and laboratories extends from 9 o'clock a. m. to 2:30 o'clock p. m. A part of the afternoon will be devoted to study and investigation. The University farm, live stock, barns, greenhouses, grounds and laboratories of the college and school of argiculture afford ample opportunity for interesting study.

There will be no lecture course on Monday, but this day will be spent in visiting places of interest, such as the stock yards, flour and flax mills, greenhouses, stock farms, etc.

For this course a fee of $10 will be charged. Board may be secured in either of the Twin Cities at $3.50 to $4.50 per week.

The school is situated at St. Anthony Park, on the Como-Harriet car line, between St. Paul and Minneapolis. Get off at Commonwealth avenue.

Farmers wishing to register for the course, or desiring further information, should address Jas. M. Drew, St. Anthony Park, Minn.

The course of lectures and study is outlined as follows:

Agriculture: Judging the qualities of soils, the selection of farms, planning farms; developing the fields, drainage, roads, fences; developing the farmstead and its buildings; managing fields and growing, cultivating, harvesting and preserving forage and grain crops; the rotation of grain cultivated and grass crops, the use of live stock, and general farm management.

Dairy husbandry: In this division there is a course of sixteen lectures giving an outline of the origin and history of the various breeds of dairy cattle, the characteristics of each and conditions to which each breed is especially adapted; the conformation and type of cow specially adapted to economical dairy work; an outline of the fundamental principles of feeding, the composition and character of the various feed stuffs with plain and practical instruction in rearing young stock and feeding dairy cows. Practice work will be given in judging dairy stock.

Animal Husbandry: During the six weeks of lecture work a series of lectures will be given on animal breeding. These lectures will include the known laws of breeding, such as heredity, variation and atavism. Attention will be given to such features as the selection of prepotent sires and dams, to cross breeding, in-breeding and other matters of interest to the breeder of live stock. Pedigrees will be discussed and the students made familiar with the registration and transfer of pure bred stock.

The feeding and management of horses, beef cattle, sheep and swine will also be discussed. Foods suitable to each class of animals, and methods of preparing and feeding them will be among the subjects receiving attention, together with directions for the practical management of stock while in the stable and pasture.

Agricultural chemistry: Soils and foods are made prominent features of the work in agricultural chemistry. Lectures are given on the conservation of the fertility of the soil, the composition and use of farm manures, the draft of different farm crops upon the soil and the methods of making the fertility of the soil available by the rotation of crops and by other means so as to secure the necessary changes in the soil to produce the highest degree of fertility. Lectures are also given on the composition and uses of human and animal foods.

Farm mechanics: The instruction given in this subject will consist of lectures on farm mechanics, taking up such subjects as pumps, farm water systems, windmills, the general principles of steam and gasoline engines, placing shafting, pulleys and belts; pipe fitting, soldering, etc. Some instruction will also be given on sharpening and using hand tools, such as saws, planes, chisels, and other tools necessary in farm practice.

Farm implements: The lectures on farm implements will be illustrated, as far as possible, by samples. Stereopticon views will be made use of in illustrating machines that cannot well be taken to the class room. It is the aim in these lectures to bring out the lines covering the draft of implements and the objects attained by their use. Suggestions will be made on selection of implements adapted to various kinds of work The care of implements when not in use will also be discussed, and an attempt made to give as fully as possible all information that will be beneficial in the care and handling of farm machinery.

Dressing and curing meats: The work in dressing and curing meats will be given in a course of demonstration lectures. In demonstrating these lectures the animals will be dressed before the class and the reason for each operation fully explained. The method of cutting up the dressed carcass for different purposes will also be shown before the class and the use and value of each cut explained. Sausage making, lard rendering, and the "working up" of all parts of the animals will be taught in a simple and direct way.

Farm accounts: A series of lectures will be given on business forms, business arithmetic and the keeping of simple farm accounts and records.

Farm botany: Eight lectures will be given on the phases of botany, of special interest to farmers; for example, the pollination of flowers; weeds and weed seeds; poisonous plants, fungus diseases of plants and how to deal with them.

Farm horticulture: Lectures will be given on the care and management of the apple and plum in this climate, including such subjects as location of the orchard, selection of the trees, planting, cultivation, green manuring; preparation for winter; advantages and disadvantages of root grafting, budding, and top working; insects and diseases injurious to orchards.

Lectures on the care and management of small fruits will consider the subjects of selection of varieties, planting and cultivation, origin of new varieties, propagation, marketing, winter protection, also the insects and diseases injurious to raspberries, blackberries, currants, gooseberries, strawberries and grapes.

Under vegetable gardening will be considered the growing of potatoes, tomatoes, celery, onions, squash and cucumbers.

Veterinary science: This work includes a series of lectures on elementary anatomy, animal foods and digestion; and causes, prevention and treatment of common diseases of farm stock. An especial effort is made to have this work practical and helpful to men who are actually handling farm stock.

Poultry: Twenty lectures will be given on this subject with special reference to the needs of the Minnesota farmer. The following subjects will be considered: Location and construction of poultry buildings and yards; a study of the breeds best adapted to the farmer's use; the hatching, rearing and management of the farmer's flock; feeding for eggs and for fattening; killing and dressing fowls, and packing for market; marketing eggs.

In addition to the above, four lecture periods will be devoted to farm workshop hints, such as splicing rope, making rope halters and rope belting, and tempering simple tools.

Economic entomology: The entomologist will give a course of lectures on injurious and beneficial insects and will discuss the various insecticides and methods of application.

If there be sufficient demand to warrant, and time permits, a few lectures will be given on birds and their relation to agriculture.

Parliamentary practice: A debating club is made up of the members of the short course class and weekly meetings are held which give opportunity for learning how to conduct public meetings and practice in public speaking.

Dairy School

THE FACULTY

CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
T. L. HAECKER, *Professor of Dairy Husbandry.*
J. A. VYE, *Creamery Records and Accounts.*
HARRY SNYDER, B. S., *Dairy Chemistry.*
M. H. REYNOLDS, M. D., V. M., *Diseases of the Dairy Cow.*
J. M. DREW, *Buildings and Stable Conveniences.*
WILLIAM BOSS, *Instructor in Practical Engineering.*
B. D. WHITE, *Instructor in Creamery Management.*
M. SONDERGAARD, *Instructor in Cultures and Starters.*
H. L. RUSSELL, Ph. D., *Dairy Bacteriology.*
A. W. PARKIN, *Instructor in Cheese Making.*
ED. K. SLATER, *Assistant Instructor in Creamery Work.*
H. J. CREDICOTT, *Assistant Instructor in Cultures and Starters.*
HENRY SANDHOLT, *Assistant in Creamery Work.*
C. B. MOAK, *Instructor in Dairy Laboratory.*
MISS JULIA BRUDE, *Instructor in Sweet Curd Cheese Work.*

The next session of the Dairy School will open Monday, November 20th, 1905, and continue four weeks.

This course is designed to furnish persons, who are actually engaged in the manufacture of butter and cheese, in creameries and cheese factories, an opportunity to become more skilled in their work, and also to study the many problems which have a direct bearing upon the dairy industry. Recognizing the fact that such persons cannot be away from business for a long period, the term has been so arranged that the time of each student is fully occupied by lectures and actual work in the creamery training room every hour of every working day of the term.

The rapid growth of the dairy industry in the Northwest calls for constant enlargement in equipments for dairy hall.

With each succeeding year as dairy products manufactured in our creameries, take higher rank in quality and finish, the character of the instruction given must be of a higher order. To meet these requirements the training rooms are each year equipped with the best apparatus, and the corps of instructors is composed of the most skillful workmen and best instructors.

No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical instruction are arranged with special reference to giving the greatest amount of training and practice possible in a four weeks' session. Large additions have been made to the equipment of the dairy hall in both butter and cheese departments; in fact, it has everything needed for conducting the work by the most approved methods.

Instruction is divided into seven courses:

1st. Lectures covering the entire field of dairy husbandry.

2d. Practical work daily in the butter room.

3d. Practical work daily in the cheese room, where the manufacture of flats, cheddars, Swiss, brick, Edam and Gouda cheese is carried on.

4th. Practice work in the laboratory, examining milk, making daily composite tests, and the pasteurization of milk and cream.

5th. Practical engineering, steam fitting and plumbing.

6th. Practical work in factory bookkeeping.

7th. Practice work with cultures and starters.

I.—LECTURES.

The course of sixty lectures furnishes in a plain and concise form the most valuable information for those who are interested in any branch of agriculture, covering, as it does, the most important points in the breeding, rearing, feeding and general management of dairy stock, the economical production of milk, growing and preserving of forage and grain crops, the management of meadows and pastures, management of barns, stables and yards, construction of silos, co-operative dairying, creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of the common diseases of the dairy cow.

II.—BUTTER MAKING.

The running of separators; ripening and churning of cream; the proper acidity of cream to secure best flavor; how to churn, wash and salt butter so as to avoid specks and mottles; to secure good grain and best methods of preparing for market—are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score card.

III.—CHEESE MAKING.

The work in the cheese room is conducted on a large scale, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the Regents to provide the necessary means for carrying on this work.

A complete record of every step taken is required of each student. Here is a good opportunity for cheese makers to meet, investigate new methods, make experiments on doubtful points, compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire.

IV.—MILK TESTING.

It has been found that the value of milk for both butter and cheese is measured by the per cent of fat content, and nearly all our factories and creameries now base the payment for milk on the fat content. It is therefore necessary for every factoryman to familiarize himself with the best methods of milk testing. The chemist gives a general outline of the work, but in order that each student may have thorough training in milk testing daily exercise is given. Steam, turbine and hand power machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is a matter of vital importance, and there is great need for improved methods of handling milk intended for this purpose. To meet this, milk and cream pasteurizing apparatus of the latest and most improved makes has been provided for the dairy school, and a few advanced students will be given instruction in this work.

V.—MOTIVE POWER.

The work in engineering consists of practical talks on the construction, care and management of creamery engines and boilers, pumps, injectors, heaters, etc., and work in the practice room.

In the practice room is provided an eight horse power simple, slide-valve engine, three types of boiler feed pumps, two types of deep well pumps, one injector, two milk pumps and a steam gauge, which the students have the privilege of examining and operating. Instruction is also given in pipe fitting, placing shafting, babbitting bearings, soldering, etc.

It is the aim to make this work as practical as possible. Questions of interest on the subject are freely discussed.

VI.—FACTORY BOOKKEEPING.

All the essential features of factory accounting from the receipt of the milk to the returns in net proceeds are thoroughly considered. Paying for the milk according to the fat content, or otherwise, is fully explained. The students do, in books provided, the actual one month's accounting of a creamery.

VII.—STARTERS AND CULTURES.

Since all students who are admitted to the school have had some experience in the routine work of running separators, and since the most important part in butter making is the art of uniformly making a product having a fine flavor and good keeping qualities special attention is given to cultures, starters and pasteurization. Constant additions will be made to the equipment needed to make this course inviting to those who wish to fit themselves for masters of the art of creamery butter making.

REQUIREMENTS FOR ADMISSION.

Experience has shown that students who have had some practical training in the creamery or cheese factory before coming to the dairy school are, as a rule, the ones who are able to make the most of the course; it is therefore required that persons who intend to take this course shall have had at least one season's experience before coming to the school. No entrance examination is required.

EXPENSE.

A registration fee of $15 is required of each student. Students can board in either city and reach the school by street car, or board can be secured near the school for from $3.50 to $4.00 per week. Each student is required to supply himself with two white suits, including caps, to be worn during working hours in the creamery and cheese rooms. The suits may be procured for about $1 each.

DAIRY CERTIFICATES.

The Regents will grant dairy certificates to students who have taken the course and passed a satisfactory examination and in addition have demonstrated by at least one year's work in a factory that they have acquired special skill in the art of butter and cheese making, and are thoroughly qualified to take charge of a creamery or cheese factory.

To reach the school from either St. Paul or Minneapolis, take the Como-Harriet street car and get off at Commonwealth avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, Minn.

The Agricultural Experiment Station

STATION OFFICERS.

WM. M. LIGGETT, *Director.*
J. A. VYE, *Secretary.*

EXPERIMENT CORPS.

SAMUEL B. GREEN, B. S., *Horticulturist.*
HARRY SNYDER, B. S., *Chemist.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinarian.*
ANDREW BOSS, *Associate Agriculturist, in Charge of Live Stock.*
FREDERICK L. WASHBURN, M. A., *Entomologist.*
T. A. HOVERSTAD, B. Agr., *Superintendent, Crookston.*
A. J. MCGUIRE, B. Agr., *Superintendent, Grand Rapids.*
J. A. HUMMEL, B. Agr., *Assistant Chemist.*
COATES P. BULL, B. Agr., *Assistant in Agriculture.*
A. G. RUGGLES, M. A., *Assistant Entomologist.*

The Agricultural Experiment Station of the University of Minnesota is devoted to the discovery of facts and processes useful to the farmers of the state, and to disseminate knowledge of improvements in agriculture and home making. This station was established in 1887, under laws enacted by the state and national goverments. It is supported in part by funds supplied through the University by the national congress, and in part by funds appropriated by the state legislature. It has also a small income from sales of products. It has published annual reports since 1892, eighty-six general bulletins, twenty press bulletins; fifteen class bulletins; and twenty-four press bulletins have been published by its sub-station at Grand Rapids.

The work of experiment stations embraces a wide range of agricultural subjects included under the headings of agriculture, horticulture, forestry, animal husbandry, dairying, agricultural chemistry, entomology and veterinary science.

Bulletins giving the results of experiments are published in editions of 15,000 copies. These are sent free to all farmers in the state who ask to have their names placed on the station

mailing list, and the postoffice department carries them free under the director's franking privilege.

The experiment station is located at University farm, St. Anthony Park, where most of its officers also teach in the college and school of agriculture. It uses the larger part of the University farm, containing 250 acres.

The work at University Farm is supplemented by that done at Crookston, where the state owns 480 acres, and at Grand Rapids, 455 acres of land fully equipped with buildings, stock, machinery, etc.

The officers of the experiment station are ever ready to advise by letter or by personal interview, and the correspondence of the station increases annually.

The experiment station is in co-operation with the U. S. Department of Agriculture and with several experiment stations in other states. Besides the sub-stations mentioned above it is assisted by nearly a score of trial stations, associated with the State Horticultural Society. It has also enlisted several hundred farmers and seed growers as seed co-operators who are aiding the station in disseminating its newly originated and tested varieties of field seeds. Nearly fifty farmers are serving as statistical co-operators and are assisting joint agents of the station and of the U. S. Department of Agriculture in securing data as to the cost of growing crops, and of producing livestock products.

PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE.

BULLETINS OF THE EXPERIMENT STATION FOR 1904.

Annual Report for 1904.

General Bulletins:

No. 83. Apples and apple growing in Minnesota.
No. 84. Injurious insects of 1903.
No. 85. Wheat and flour investigations.
No. 86. (1) The food value of sugar.
(2) The digestive action of milk.

Press Bulletins:

No. 17. Winter Wheat in Minnesota.
No. 18. Seed Corn Famine.
No. 19. A Plea for some of Our Common Birds Based upon their Food Habits.
No. 20. Hardy Alfalfa in Minnesota.

THE FARM STUDENTS' REVIEW.

The Alumni Association of the School of Agriculture, with some aid by officers of the department, publishes a monthly agricultural paper. This paper aims to keep the graduates in touch with each other, and with the department, and provides a medium through which they may relate their experiences in various lines of farming, and home making. It publishes articles by graduates, students, members of the faculty and by others especially qualified to discuss agriculture, live stock, dairying, horticulture, agricultural chemistry, home economics, the rural school and other subjects relating to country life. It serves also as a semi-official organ of the Alumni Association and of the Farmers' Club of Minnesota (an organization made up of students and ex-students of all the courses of the department of agriculture).

Students

COLLEGE OF AGRICULTURE.

SENIORS—6.

Boerner, Emil Godleip, Buffalo.
Cuzner, Harold, St. Anthony Park.
Jehle, Robert Andrew, St. Paul.
Parker, Edward C., St. Paul.
Van Slyke, Letitia, Northfield.
Wilson, Archie Dell, St. Anthony Park.

JUNIORS—5.

Detwiler, Samuel B., St. Anthony Park.
Peck, W. A., St. Anthony Park.
Southworth, Pierre Duane, Mondovi, Wis.
Thompson, A. Adele, Minneapolis.
Tierney, Dillon P., Farmington.

SOPHOMORES—11.

Andrews, John Kimball, Faribault.
Blair, Donald Scripture, St. Paul.
Cox, William Thomas, Glenwood.
Gaumnitz, Amos John, St. Cloud.
Leager, Marc Carl, Aberdeen, S. D.
Muir, Harry Scott, Winnebago City.
Peterson, William Arnold, Olivia.
Rose, John DeCew, St. Anthony Park.
Soares, Albert Gaulter, Minneapolis.
Tomhave, William H., Minneapolis.
Torrance, James B., Minneapolis.

FRESHMEN—10.

Bingham, Charles L., St. Paul.
Cady, LeRoy, St. Anthony Park.
Frear, Dana Walter, Minnetonka.
Gaumnitz, Carl, St. Cloud.
Knorr, Frederick, St. Anthony Park.
Mayland, Edwin, Rushford.
Moore, Walter Morrison, St. Paul.
Skoglund, Walter L., St. Anthony Park.
White, Hall Brewer, Winnebago.
Whitney, June D., Minneapolis.

THE SCHOOL OF AGRICULTURE.

STUDENTS 1904-05.

Intermediate year	5	
A Class	101	
B Class	172	
C Class	252	
		530
Farmers' Short Course		121
Dairy School		109
		760

INTERMEDIATE YEAR—5.

Blackburn, J. R., Royal, Neb.
Frear, Dana W., Minnetonka.
Holmberg, Ruth H., Renville.
Larson, Henry W., Swea City, Iowa.
Stewart, Charles D., Alpha.

"A." CLASS—101.

Ainslie, George G., Rochester.
Angell, James B., White Bear Lake.
Apitz, Robert H., Amboy.
Atkins, Arthur D., Columbia, S. D.
Bailey, Clyde H., Minneapolis.
Barton, Ralph W., International Falls.
Beeson, C. M., Breckenridge.
Betts, Alice G., Fairmont.
Bleecker, Mary E., Mantorville, R. 2.
Bleecker, Wm. L., Mantorville, R. 2.
Burkholder, Amy C., Winnebago City.
Burton, Hazel, Deephaven.
Carleton, Lizzie A., Plainview, R. 1.
Carlton, Mabel M., Medford, R. 1.
Carr, Linnie M., Long Lake, R. 1.
Carroll, Henry B., St. Paul.
Chapman, Lulu E., Osseo, R. 4.
Chase, Clement G., Farmington.
Cole, Marcus C., Davies.
Cooley, Fanny A., Alexandria, R. 2.
Curtis, Jay L., Alexandria, R. 3.
Cutlar, Lester B., Sumter.
Dailey, Edward W., Pipestone.
Dailey, Lawrence E., Pipestone.
Davenport, Emeline L., Western.
Detwiler, Samuel B., St. Anthony Park.
Dike, George E., Northfield.
Dixon, Helen C., Mora.
Doehne, Lulu E., New Ulm.
Donovan, Raymond L., Dundas.
Downie, Jennette E., Faribault, R. 1.

Dunn, Catherine A.,
Lakeville, R. 1.
Ellsworth, Horace W.,
Cannon Falls.
Ely, Herbert I.,
St. Croix Falls, Wis.
Evenson, Nels O.,
Litchfield, R. 7.
Fish, Gertrude B., Utica.
Flom, Joseph O.,
Dennison, R. 2.
Gammon, Inez E.,
Excelsior, R. 3.
Garrett, Henry D.,
New Brighton, R. 1.
Gaumnitz, Florence,
St. Cloud, R. 1.
Gibson, Blossom E.,
St. Anthony Park.
Greaves, Harold A., Northfield.
Grey, Arthur B.,
North Branch, R. 4.
Gudal, Jorgen O.,
Bricelyn, R. 3.
Hall, Avis C., St. Anthony Park.
Hall, Charles E.,
Fairmont, R. 1.
Hammer, Ira J., Utica.
Harper, Roy S., St. Paul.
Hoagland, Jessie M.,
Minnetonka Mills, R. 2.
Holmquist, Alice W.,
Providence.
Holtmeier, Theodore J.,
St. Bonifacius, R. 1.
Hulst, Geo. W., Fairhaven.
Hunt, Robert J.,
River Falls, Wis., R. 1.
Jehle, Robert A., Lindstrom.
Jenkins, Wm. G., St. Paul.
Jernell, Jennie S., Minneapolis.
Johnson, John S.,
St. Paul Park.
Johnson, Mary M., Sherburne.
Kanten, Iver C., Milan, R. 1.
Kern, Harry F., Lake Elmo.
Langseth, Oscar H.,
Worthington, R. 2.
Larson, John S., Ulen, R. 1.
Lathrop, Elbe A., Forest Lake.
Lathrop, Mabel A.,
Forest Lake.
Leavitt, Geo. D.,
Red Wing, R. 1.
Le Gro, Emma, Bertha.
Ley, Peter J., Kellogg.
McNelly, Chester L.,
Caledonia, R. 1.
Martin, Nathaniel, Clear Lake.
Martinson, Henry R.,
Sacred Heart.
Mattice, N. Leslie,
Minneapolis, Sta. D.
Merrill, Alfred S., Minneapolis.
Mills, Rodney N., Buffalo, R. 3.
Moore, Harry C., Hutchinson.
Murdock, Harry L.,
Clarkston, Wash.
Norman, Hilma O., Kandiyohi.
Norskog, Caroline M.,
Eddsville.
Ott, Robert L.,
Albert Lea, R. 4.
Parten, Lillie T., Minneapolis.
Peterson, Laura C.,
Minneapolis, R. 4.
Peterson, Wm. A., Olivia.
Putnam, Fayette H.,
Elk River.
Quam, Estella A., New London.
Regan, Katherine M.,
Stillwater, R. 5.
Retzlaff, Minnie B., New Ulm.
Robertson, Lynn S., London.
Sherman, Etta L.,
Lake Geneva, Wis.
Sorenson, Arthur M.,
Albert Lea.
Swenson, David, Willmar.
Swenson, Edgar B.,
Louisburg, R. 1.
Talle, Marie B., Kenyon.
Talle, Peder O., Kenyon.
Thayer, Roy C., Froesman, Ind.
Thompson, Adel,
Cottage Grove.
Tierney, Dillon P., Farmington.
Tuttle, Lucius P., St. Charles.
Ville, Henrietta M., Echo.
Webster, Alfred A.,
Lafayette, R. 1.
West, Ralph L., Minneapolis.
Wildner, Clarence L.,
Superior, Wis.
Wilhelmsen, Wilhelm,
Spring Grove, R. 2.

"B" CLASS—172.

Aanes, Susanna, Clarkfield, R. 1.
Anderson, Albert B., White Willow.
Anderson, Henry W., Starbuck, R. 4.
Anderson, Martha, Mattson.
Anderson, Theodore C., Hazel Run.
Austin, Reed S., Minneapolis.
Babcock, Genevieve, St. Paul.
Bailey, Phoebe G., Duluth.
Barker, Emil V., Atwater.
Bartholomew, Ross, Minneapolis, Sta. F., R. 3.
Beaulieu, Francis D., White Earth.
Bellinger, Fred W., Cannon Falls.
Benham, Kenneth R., Merriam Park.
Bennett, Frank G., Argyle.
Berg, Lena M., Trondjem.
Bergh, Edmund C., Hendrum.
Blase, Arthur, North St. Paul.
Bork, Albert, New Paynesville.
Borlaug, Helen M., Kenyon.
Bost, Morris A., Excelsior.
Bowen, Ray R., Kanaranzi.
Bowman, May V., Rosetown, Mpls. P. O.
Bredvold, August J., Belview.
Brekke, Andrea J., Kenyon.
Bren, Samuel, Hopkins.
Burger, Irene E., Staples.
Bush, Harvey M., Minneapolis.
Carlson, Lillian, Minneapolis.
Cin, Clara, Donnelly.
Cin, Sarah, Donnelly.
Clapp, Harry H., Roberts, Wis.
Cooley, Harvey W., St. Anthony Falls.
Corser, Frederick, Minneapolis.
Crozier, John B., Minneapolis.
Dahlberg, Anna E., Fergus Falls.
Dahlquist, Henry D., Warren.
Davis, Mortimer, Monticello.
Dedon, Denton, Taylors Falls.
DeMars, Stuart, Minneapolis.
Denzer, Frank J., West St. Paul, R. 2.
Dixon, Samuel C., North St. Paul.
Doyle, John B., Wayzata.
Dukleth, Oscar, Hendrum.
Dusschee, James T., Lanesboro.
Edwards, June A., Spring Valley.
Elwell, Chester A., Minneapolis.
Enright, Thomas S., Rose Creek.
Eustis, Murray S., Forest Lake.
Flom, Halvor A., Kenyon, R. 5.
Frenn, Albert E., Red Wing, R. 1.
Gammell, Myrtie A., Grand Meadow.
Gardner, Harriet R., Big Stone.
Garrett, Walter C., New Brighton.
Gilles, DeWitt C., Minneapolis.
Greenwalt, Dorothy A., Withrow.
Greenwalt, Lillian C., Withrow.
Gudal, Nellie B., Bricelyn.
Hall, Jessie M., Minneapolis.
Hall, Ray N., Winnebago City.
Halverson, Oscar, Spring Grove.
Halvorson, Magnus, Norway Lake.
Hanson, Minnie, Henning.
Harris, John S., Merriam Park.
Hartenstein, Edward C., St. Paul Park.
Hastay, Clifford T., Minneapolis.
Haugen, Olai, Zumbrota, R. 6.
Heywood, Ralph M., Minneapolis.
Hilgeson, Halge, Minneapolis.
Hille, Hans O., Webster.
Hjermstad, Morten, St. Peter, R. 3.
Hodgson, Victor A., Luverne.
Howard, Minnie F., St. Paul.
Hunstad, Peter N., Bath, S. D.
Jacobson, Oscar P., Fawndale, R. 1.
Iverson, Andrew, Zumbrota, R. 1.

Jaquith, Roy E., Minnetonka.
Johnson, Charles N.,
Northfield, R. 4.
Johnson, Theodore J.,
Northfield.
Keller, Peter J.,
Merriam Park, R. 1.
King, M. Inez, Spring Valley.
Kloos, John D., Chaska, R. 3.
Kreher, Jennie M., Minneapolis.
Krogh, Frederick G.,
St. Anthony Park.
Lane, Dwight J.,
Minnetonka, R. 1.
Lathrop, Orley K., Forest Lake.
Lenhart, Ella M.,
Merriam Park, R. 8.
Liddell, Jennie, Kellogg.
Linder, Leopold S., Mankato.
Lunde, Sigrid, Spring Grove.
Lydon, Edward, Kellogg.
McArthur, Graham S., Hancock.
McClure, Wayne C.,
Manhattan, Ill.
Maring, Gina, Dennison, R. 2.
Marple, Ruth L., Wendell.
Mayne, James C.,
St. Anthony Park.
Meisch, Henry A., Rollingstone.
Melsness, Martin, Sacred Heart.
Mielke, Geo. H., Dundas.
Monson, Eva D.,
Elbow Lake, R. 2.
Monson, Orville J.,
Elbow Lake, R. 2.
Murphy. Harley F., St. Paul.
Murphy, Hazel I., St. Paul.
Nelson, Josie E., Minneapolis.
Noltimier, Mark, St. Paul.
Noltimier, Zoa E., St. Paul.
Norskog, Conrad B., Eddsville.
Olson, Arthur O., Brandon.
Oppegard, Bertha,
Sacred Heart.
Oppegard, Henry A.,
Sacred Heart.
Palmer, Ernest G.,
Minneapolis, R. 5.
Palmer, V. J., Minneapolis, R. 5.
Palmer, Wm. A.,
Minneapolis, R. 3.
Pearson, Julick, Gladstone.
Pederson, Emma P.,
Cannon Falls.
Perkins, Bert B.,
Monticello, R. 4.
Peter, Emil,
West St. Paul, R. 2.
Peterson, John M., Dawson.
Peterson, Wallace E., Waverly.
Philley, John L., Louisburg.
Pickett, Allan L., Superior, Wis.
Ramstad, Elvin. S., Audubon.
Rathjen, William, Kanaranzi.
Raymond, Newton,
Minneapolis, Sta. F., R. 3.
Riechel, Annie M., Faribault.
Rischatsch, Edward, St. Paul.
Roberts, Arthur H., Roberts.
Roberts, Henry, Fergus Falls.
Rose, Myrtle I.,
New Brighton, R. 9.
Rydeen, John A., Oberg.
St. Martin, Victor C.,
Minneapolis, R. 1.
Sampson, Walter C., Strout.
Sanford, Henry C., Minneapolis.
Sargent, Forrest H.,
Red Wing, R. 2.
Savage, Edward W., Windom.
Schrepel, Claudena L.,
Le Sueur.
Scott, Warner C.,
Minneapolis, Sta. F., R. 3.
Seager, Clarence L.,
Cannon Falls.
Seavey, Clark H., Superior, Wis.
Sewall, Thomas R.,
St. Anthony Park.
Sonstegard, Peter O.,
Georgeville.
Staples, Alice M., St. Paul.
Stearns, Eva M., Fort Snelling.
Stromberg, Edwin O.,
Buffalo, R. 2.
Swenson, Albert E., Watson.
Swezey, Addie A., Clinton.
Swoffer, Walter, Walnut Grove.
Tanner, Eliza M., Brownsdale.
Thayer, Alvin E.,
Foresman, Ind.
Taylor, Geo. S., Litchfield.
Theilmann, Theodore C.,
Excelsior.
Thompson, Nettie, Hazel Run.
Thorpe, Florence A.,
Long Lake.

Tomte, George A., Sacred Heart.
Tostevin, Guy F., St. Paul.
Trieloff, Erich C., Carver.
Trondson, Albert O., Lakefield.
Trovatten, Louis H., Hazel Run.
Turner, Elmo, St. Paul.
Tyrrell, Talcott T., St. Anthony Park.
Ulrich, Edward H., Biscay.
Urness, Elizabeth H., Kenyon.
Veeder, Geo. F., Minneapolis.
Vinje, Svein, Dalton.
Von Wald, Herbert C., Nerstrand, R. 2.
Voxland, Halvor L., Kenyon, R. 4.
White, Frank W., Marshall.
Wickstrom, Lizzie B., Anoka.
Wilkus, August J., St. Paul.
Wille, Henry, Morris.
Wilson, Cora, Granite Falls.
Wilson, Henry H., Anoka.
Winters, Chester J., Mazeppa.

"C" CLASS—252.

Ainslie, Robert T., Chatfield.
Amsden, Wm. L., Groton, S. D.
Anderson, Albert C., Albert Lea, R. 6.
Anderson, Reuben W., Lindstrom.
Ashworth, Harold E., Minneapolis.
Atz, Lloyd A., Farmington.
Baker, Emmet D., Josephine, Mont.
Barsness, Fred, Kenyon, R. 6.
Bassett, Morten H., Rushmore.
Belgum, Ella, Farwell.
Bennett, Wm., Madison.
Berg, Joseph H., Willmar, R. 1.
Billings, Carlos R., Audubon.
Billings, Hiram E., Audubon.
Bjerkeng, Jens L., Fergus Falls.
Bjorlie, Ingebord, Ottofy, N. D.
Bleecker, Leslie H., Waterloo, Wis.
Blexrud, Knute, Spring Grove, R. 2.
Boese, Freda M., Atwater.
Bohannon, Archie C., Minneapolis.
Bohannon, Ira F., Minneapolis.
Bollum, Olaf E., Goodhue, R. 3.
Bouman, Ado, Minneapolis.
Brandt, Henry P., Morris, R. 1.
Brattland, Albert, Hendrum.
Brown, Edward W., Luverne.
Brix, Herman, Willmar.
Bryan, Edwin F., Anoka, R. 3.
Butterfield, Helen, Long Lake, R. 1.
Carlisle, Clifford A., Stacy.
Carpenter, Paul, Sleepy Eye, R. 5.
Chermak, Minnie, Chatfield, R. 4.
Christie, Howard C., Kawende, Man.
Clark, Scott, Morris.
Cleator, Fred W., Minneapolis.
Comings, George H., Eau Claire, Wis.
Cook, Martha M., Somerset, Wis.
Crimmins, Ellen M., Minneapolis.
Cristadoro, Bertha C., St. Paul.
Davenport, Frank W., Maple Plain.
Davis, Oscar D., Audubon.
Devaney, Thomas R., Waverly.
Donald, Andrew R., Elk River, R. 3.
Doty, Archie G., Eyota.
Duffy, George L., Minneapolis.
Dunning, Harold O., Minneapolis.
Durkee, Flora B., Hancock.
Durkee, Philander, Hancock.
Dysart, Royce L., Luverne.
Eastman, Emil I., Beardsley, R. 1.
Ekman, Sydney, St. Anthony Park.
Ekroth, Elsie V., North St. Paul.
Evans, Catherine M., Merriam Park.

Evenson, Eldor S.,
Sacred Heart, R. 2.
Evenson, Emil H.,
Sacred Heart, R. 3.
Feroe, Peter J., Granite Falls.
Field, Carl, Nora Springs, Ia.
Field, Martin, Nora Springs, Ia.
Foslien, Theodore, Garfield.
Froeming, Robert A.,
Parkers Prairie.
Gage, Marjorie, Minneapolis.
George, Bessie, Correll.
Getchell, Leslie G., Morris.
Gordon, Elmer I., Hendrum.
Graham, William B., Freeport.
Grattan, Harlan W.,
Minneapolis.
Greenwalt, James A., Withrow
Greethurst, Charles, Lewiston.
Hagen, Alberta L., St. Paul.
Hall, Fay E., Morris.
Hallan, Joseph A., Spring Grove.
Hallum, Katherine A.,
Minneapolis.
Halversen, Josephine E.,
Norway Lake.
Hanson, Martena J., Henning.
Hanson, Wm. H., Big Lake.
Haw, John W., Superior, Wis.
Held, Julius W., St. Louis Park.
Hickman, Emmett E.,
Minneapolis.
Hickman, Walter R. B.,
St. Paul.
Higgins, Bradley,
Levant, Maine.
Hodgson, Marie, Minneapolis.
Hohage, Cleve H.,
Minneapolis, Sta. F., R. 3.
Hohage, John M.,
Minneapolis, Sta. F., R. 3.
Holden, Dee, Amboy.
Holland, Jasper, Hanley Falls.
Holland, Rachel, Hanley Falls.
Holmquist, Oscar W.,
Providence.
Horton, Orrin B., St. Paul.
Howard, Bert, Madelia.
Howard, John F., St. Paul.
Hulst, Charles J., St. Cloud.
Huper, Henry C., Wells, R. 2.
Hurley, Vincent A., Louisburg.
Hursh, Floyd, Long Lake.
Ingalls, Clyde W.,
Merriam Park.
Irvine, Robert, St. Paul.
Jacobson, Mabel L.,
Baldwin, Wis.
James, Edwin, Glenwood.
Johnson, Albert W.,
Lafayette, R. 1.
Johnson, Theodore H.,
Madison.
Johnson, Herbert M.,
Cambridge.
Johnson, Elfort O., Cokato.
Johnsoy, Selma, Starbuck, R. 2.
Johnsrud, Peder L.,
Spring Grove, R. 3.
Jones, Gerald T., Luverne.
Kalkmann, John, Clear Lake.
Keller, Elmer J., Dundas, R. 1.
Keller, Martha K., Dundas.
Kern, Harry E., Minneapolis.
Kernkamp, Florence E.,
St. Paul Park.
King, Eugene, St. Paul.
Kittleson, Charles L.,
Litchfield, R. 6.
Kittleson, George,
Litchfield, R. 6.
Klug, Ewald, Leaf Valley.
Knutson, Melvin, Goodhue, R. 4.
Kreher, Henry, Minneapolis.
Lamb, Eva J., Mazeppa.
Langseth, Clarence C.,
Worthington, R. 2.
Larson, Ella, St. Anthony Park.
Layman, Walter D.,
Minneapolis, R. 3.
Levin, Ernest Peter,
St. Peter, R. 2.
Lewis, Pauline L., Long Lake.
Libby, Helen, St. Paul.
Linde, Ernest G.,
Abercrombie, N. D.
Longfellow, Charles S.,
Minneapolis.
Loomer, Frederick A.,
Sherburn, R. 2.
Lorenz, Mabel, Eureka.
Lowe, Florence,
St. Anthony Park.
Lundgren, Magda E.,
Excelsior, R. 3.
Lundholm, Agnes, St. Paul.

Lydiard, Susie, Long Lake.
Lyngstad, Peter A., Watson.
McCurry, Joseph H., Westport.
McNairy, Harry D., Lake City.
Maitrejean, Ella M.,
Somerset, Wis.
Marquardt, Minnie, St. Paul.
Mandell, Lloyd, Faribault.
Marple, Paul A., Wendell.
Maylott, Alfred G., Hancock.
Mayne, Mac H.,
St. Anthony Park.
Meierding, Herman E.,
Morgan, R. 2.
Miller, Estella A.,
Excelsior, R. 1.
Miller, Robert S., Minneapolis.
Monson, Irving A., Elbow Lake.
Monson, Laura, New London.
Moore, Chester A.,
Stewart, R. 2.
Mork, Ludwig H., Bricelyn.
Myhre, Carl A., Caledonia, R. 1.
Nelson, Marie, Minneapolis.
Nelson, Merritt H., Litchfield.
Nelson, Herman E., Nicollet.
Ness, Lars, Perley.
Ness, Oscar P., Litchfield, R. 7.
Nicholson, Ivy, Hamline.
Noble, Charles W., Glenwood.
Norin, Ada M., Willmar.
Norling, Albert L., Svea, R. 1.
Nowlan, Hazel E., Minneapolis.
Oakes, Webster, Merriam Park.
Ohnstad, Louis, Cannon Falls.
Oie, Severin, Sacred Heart.
Olsen, Alice, Benson.
Olsen, Oscar F., Delhi.
Olson, Rudolph, Watson.
Olson, Wm. A. K., Halstad, R. 1.
Orr, Harry C., Afton, R. 14.
Palmer, Wm. S., Afton, R. 1.
Pattee, Ralph E., Minneapolis.
Pederson, Christine, Clarkfield.
Pengilly, Mary E.,
Shakopee, R. 1.
Peterson, Edwin R.,
Willmar, Box 341.
Peterson, Estella,
Stillwater, R. 3.
Peterson, Thomas, Ashby.
Peterson, Walter I., Canton.
Philley, Edgar E., Louisburg.
Philley, Olive F., Mazeppa.
Phillips, Ellen, Excelsior, R. 3.
Phillips, Richard,
Le Sueur, R. 1.
Pierce, Nat, Lewiston.
Pourtales, Louis F., Northfield.
Quam, Oscar A., New London.
Quist, Emil, New Sweden.
Rask, Oliver H., Hendrum.
Reidhead, John M., Osseo, R. 1.
Rice, Edson, Lewiston.
Robbins, Leon H.,
Clearwater, R. 2.
Robbins, Raymond S.,
Red Lodge, Mont.
Roberts, Ray H.,
Langdon, R. 16.
Robey, Thornton W.,
River Falls, Wis.
Robinson, Mabel, Minneapolis.
Ronning, Edwin, Dalton.
Routhe, Anton C., Morgan.
Routhe, Walter L., Morgan.
Rudolph, Eugene C., Annandale.
Sagnes, Lena H.,
Sacred Heart, R. 2.
Sampson, Blanche,
Excelsior, R. 1.
Samuelson, Levi W.,
Lafayette, R. 1.
Sandager, Martin N., Belview.
Sanford, Robert, Faribault, R. 4.
Schlattmann, Paul E., Alberta.
Schwartau, John H.,
Red Wing, R. 1.
Seip, Henry, Beardsley.
Shelley, Ella, Hanska.
Sherman, Alton C., Clinton.
Smith, Ethelyn, Minneapolis.
Smith, Flora Belle, Osseo.
Smith, Forest C., Luverne.
Smith, Josephine, Minneapolis.
Smith, Wycliffe, M., St. Paul.
Solhaug, Louis G.,
Starbuck, R. 5.
Stearns, Arthur J.,
Verdon, S. D.
Stenborg, Julius C. W.,
Stillwater, R. 3.
Stewart, Whitney B., Alpha.
Stickney, Horace T.,
Clear Lake.
Stoneburg, Clarence,
Cambridge.
Strate, Louis A., New Ulm, R. 1.

Strate, Wm. E., New Ulm, R. 1.
Strŏmbo, Mattie P., Dalton.
Stuhr, Anna H., Buffalo, R. 4.
Swanson, Charles O., Morris, R. 2.
Swanson, Victor J., Florine, N. D.
Swedberg, Jasper I., White Bear.
Swenson, Eva E., St. Paul.
Torgerson, Henry C., Lanesboro.
Torkelson, Emil H., St. James.
Trondson, Ole, Lamberton, R. 2.
Trondson, Theodore H., Lakefield.
Trovatten, Birdie, Park River, N. D.
Trovatten, George A., Park River, N. D.
Trovatten, John G., Hanley Falls.
Trow, Fay A., Glenville.
Turner, Winfield H., St. Peter.
Tuttle, Ray C., Verdi.
Tweton, Rudolph H., Caledonia, R. 1.
Underdahl, Gertrude, Nerstrand, R. 2.
Underleak, Frances, Chatfield.
Vagt, John, Jackson, R. 2.
Venzke, Harry E., Cardigan Junction.
Viken, Thomas, Sacred Heart, R. 3.
Ward, Guy H., Carver, R. 1.
Ward, Raymond M., Blakeley, R. 2.
Watkins, Walter O., Carlton.
Wedge, Jesse C., Albert Lea.
White, Winnifred E., Winnebago City.
Wilcox, Alfred G., White Bear.
Wilcox, William W., White Bear.
Wille, Fred H., Hancock.
Winge, Oscar E., St. Paul.
Wittensten, Frank, Warren.
Woods, Lynn, Correll.
Wooldridge, Walter, Stewartville.
Zumwinkle, Charles G., Morton, R. 1.

FARMERS' SHORT COURSE—121.

Abrahamsen, P., Lanesboro.
Agro, Martin, Sacred Heart.
Amley, H. T., Ellensdale, N. D.
Anderson, A. V., Goodhue, R. 5.
Almlie, H. P., Bricelyn, R. 3.
Anderson, Albert P., Dassel, R. 1.
Anderson, Fred, Adelaide.
Anderson, G. H., Sherburn.
Anderson, E. D., Perley.
Asheim, Samuel, Minneapolis.
Atkinson, G., Zumbro Falls.
Anderson, G. W., Grandy.
Becker, Jacob, Faribault.
Beneteau, P., St. Paul.
Bergeson, H., Ogemas, Wis.
Billings, C. R. Sr., Audubon, R. 3.
Bond, L. M., St. Paul.
Brown, W. W., Amenia, N. D.
Bungum, T., Hayfield.
Carroll, H. B., St. Paul.
Caughey, W. P., Brainerd.
Conlin, F. S., North St. Paul.
Conlin, Martin, North St. Paul.
Conrad, John J., Luverne.
Danielson, A. G., Sherburn.
Ducholm, Nels, Merriam Park.
Eid, Albert, Montevideo.
Eliason, S. G., Montevideo.
Ellison, T. S., Hamline.
Enestvedt, E. G., Sacred Heart, R. 1.
Erickson, Halvor, Fergus Falls.
Evenson, Adolph, Jackson.
Evenson, Fred, Strout, R. 7.
Forstrom, A. E., Dunnell, R. 2.
Gabrielson, Charles, Maple Plain, R. 1.
Glotfelter, C. W., Waterville.
Gratias, Otto, Binford, N. D.
Grinde, Erick, Nerstrand.
Gulbranson, Carl, Lanesboro.
Gudal, O. A., Bricelyn, R 3
Haglund, Victor, Dassel.
Haugsven, S., Wheelock, N. D.
Healey, E. D., Mapleton.
Healey, O. W., Mapleton.
Henderson, E. J., Redwood Falls.

Hendrickson, Peter, Little Falls.
Hemmingway, F. L.,
Vernon Center.
Hjermstad, Hans, Balston, R. 2.
Howard, D. C., Glencoe, Ill.
Huke, John, Nerstrand.
Johnshoy, H. M., Starbuck.
Johnson, Carl, Argyle.
Johnson, C. S., Albert Lea.
Johnson, Geo. B., Glenwood.
Johnson, Joseph C., Albert Lea.
Johnson, Reuben, Hallock.
Kanten, O. G., Milan.
Kittelsland, J. P.,
Sacred Heart, R. 1.
Kleven, Peter, Belle Plaine.
Koester, Karl, Northfield, R. 2.
Lindquist, Ernest, Starbuck.
Ludlow, H. M., Worthington.
Lee, Frank E., Litchfield, R. 7.
Lindblad, Oscar, Svea.
Larson, August, St. Paul.
Lovell, C. C., Minneapolis.
Leland, B. S.,
Abercrombie, N. D.
Lodahl, Alfred,
Abercrombie, N. D.
Larson, Martin,
Cannon Falls, R. 7.
McConnell, R. E., St. Cloud.
Marshall, H., Shakopee.
Merchant, M. F.,
Ellendale, N. D.
Miller, George H.,
Northfield, R. 2.
Mix, Frank, Red Wing.
Mooney, M. F., St. Paul.
Myhre, F., Clarkfield.
Nelson, Charles F., Braham.
Nelson, Gilbert A., Olivia.
Nelson, John, Lakeland.
Nelson, John A., Clinton.
Nichols, H. C., Duluth.
Norelius, Chas. E., Luverne.
Olson, Albert O., Madelia, R. 3.
Olson, Chester, Adelaide.
Olson, E., Clinton.
Olson, O. H., Dunnell.
Oppegard, E. O., Sacred Heart.
Oppliger, E. J., Hancock.
Ostenso, Ole, Montevideo.
Overby, Jens, Kenyon, R. 1.
Page, C. E., Langdon, R. 15.
Pederson, P. H., Delhi.
Peterson, M. F., Cannon Falls.
Peterson, Oscar J,. Waverly.
Phelps, E., Mapleton.
Prestegard, Carl, Pratt.
Pond, Robert,
Minneapolis, Sta. F., R. 1.
Robinson, W. B.,
Winnebago City.
Rosedahl, D. E., Bricelyn, R. 3.
Roth, V. J., Vermillion.
Rustad, J. O., Whalen.
Sanders, Wm. O., Clinton.
Skotterud, Robert, Dawson.
Shoquist, J. A., Clinton.
Smedstad, Alfred, Starbuck.
Sontag, L., Somerset, Wis.
Solomonson, P. E., Twin Valley.
Spicer, M. W., Willmar.
Springer, J. J., Zumbro Falls.
Stork, W. P., New Ulm.
Strand, George, Benson, Minn.
Stromme, C. A., Kenyon.
Swanson, H., Lamberton.
Suter, C. A., Welcome.
Treaner, J. H., Mapleton.
Thompson, Stanley H.,
Ayr, N. D.
Vavrina, L., Tabor.
Wasson, R., Marshall, R. 5.
Werner, J. N., Vermillion.
Whitcomb, E. B., St. Paul.
Wildung, W. H., Howard Lake.

DAIRY SCHOOL—109.

Albers, Ernest, Royalton.
Anderson, Fred, Irving.
Anderson, Gus, Long Siding.
Baden, Frank C., Litchfield.
Beach, Edward, Henderson.
Beilke, Reinhardt, Acoma.
Bjerkeng, Jens L., Fergus Falls.
Bloomquist, John,
Taylors Falls.
Brunning, John H., Bluffton.
Byboth, Oluf, Rushford.
Campbell, J. E., Anoka.
Challstrom, Charles E.,
Cambridge.
Christen, Paul, Albany.
Colin, Erick J., Rush City.
Crane, Hugh W., Mankato.

Dedrickson, John M., Baldwin, Wis.
Dehn, Fred W., New Ulm.
Dennin, Albert, Cologne.
Dommer, Herman, Henderson.
Dolseth, Alfred, Minneapolis.
Dunton, Stephen H., Annandale.
Drake, George M., Fairfax.
Davidson, C. M., Minneapolis.
Dahlman, Arthur, North Branch.
Edmond, Samuel B., Lake Elizabeth,
Emerson, Clarence M., Armstrong.
Eppler, Edward C., Delano.
Erikson, August, Lake Elizabeth.
Erickson, Fred E., Hutchinson.
Ferm, August, Range, Wis.
Fisher, George, Sauk Center.
Fjone, Carl, Lake Mills, Ia.
Flagel, Louis H., Osterdock, Ia.
Frederickson, Carl L., Godahl.
Frost, J. C., Withee, Wis.
Gleason, Delbert W., Lewiston.
Goetsch, Herman, Money Creek.
Gulsvig, Carl L., Belgrade.
Gustafson, A. L., Lyndale.
Gwinn, Thomas R., Stockton.
Halvorson, H. O., Withrow.
Hanson, Carl K., Northfield.
Hansen, Joe, Evan.
Harms, John, Ada.
Hawkinson, A. G., Harris.
Hein, John, Biscay.
Heinz, Awaldt, Emmons.
Holste, Fred W., Blakeley.
Hennes, Lambert P., Torah.
Hinze, Fred C., Le Sueur Center.
Hughes, Albert O., Kasota.
Jacobson, F., Ellendale.
Jarchow, Henry W., Welcome
Jensen, Nels M., Forest Lake.
Johnson, Arthur, Blooming Prairie.
Johnson, Frank O., Carver.
Johnson, G. A., Zimmerman.
Knickerbocker, John W., Northfield.
Knowlen, Earl G., Eden Prairie.
Kowitz, Herman, St. Joseph, Mo.
Krantz, Valentine E., New Paynesville.
Krogstad, Bennie, Rindal.
Larson, Herman, Deer Park, Wis.
Larson, Harley, Clarissa.
Larson, James H., Shafer.
Lee, Selmer I., Clarkfield.
Maehling, Leo, Buffalo.
Matheson, George, Shellmouth, Man.
Mehrwerth, John, Rock.
Micklish, John J., Freeport.
Miller, Christ A., Hartland.
Moores, Jr., Calvin, Monticello.
Muehlstedt, Emil, Arlington.
Mulville, Daniel, Darwin.
Norberg, Andrew, Cokato, R. 4.
Odegard, Edwin, Santiago.
Olson, John L., Cokato, R. 2.
Olsen, H. P., Ashby.
Olson, Theodore G., Hartland.
Oman, Emil G., Grandy.
Palmer, Philip, Lafayette.
Pappenfus, S. J., Gilman.
Patten, Ray C., Meriden.
Penk, Otto, Arlington.
Peterson, Charles A., Otisville.
Proper, D., Little Falls.
Reginball, Louis A., Argyle.
Runke, Louis, Mapleton.
Rusley, Ole O., Lake Mills, Ia.
Scott, Walter R., Winnebago.
Shimin, Edgar T., Kimball.
Sloniker, Wm. L., Buckman.
Strommen, Carl, Gary.
Stowe, O. K., Glendorado.
Stuckey, Godfrey, West Concord.
Swelin, E. W., Grandy.
Sutherland, N. D., Hample, N. D.
Thompson, W. A., Truman.
Tuttle, Leroy P., New Richland.
Ulring, Edwin, Webster.
Underdahl, Elling I., Cannon Falls.
Weise, Otto, Lakefield.
Wilander, Anton W., Gibbon.
Winters, Robert, Madison.
Woller, Fred, Nicollet.
Wobbrock, Will, Owatonna.
Wrabek, Thomas, New Prague.
Wuertz, Joseph, Lake Henry.
Zoerb, Alfred, Loretto.